

Policy Options for Military Recruiting in the College Market

Results from a National Survey

BETH ASCH

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MATTHIAS SCHONLAU



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Preface

The armed services prefer to recruit high-quality youth because of their better performance and lower attrition. However, high-quality youth are increasingly interested in attending college. While existing policies, such as the Montgomery GI Bill, that are targeted to the recruitment of the college market are likely to continue to have an effect, new policies must be developed to successfully penetrate this market and expand the supply of high-quality recruits. Indeed, the services have begun to develop programs, such as the Army's "College First" program, which allows youth to attend college prior to entry into the military and receive a college benefit provided by the military. To be fully engaged in the college market, the services may need to fine-tune these programs to enhance their effectiveness and will require a variety of programs tailored to reach different segments of the market such as college dropouts and college-bound high school youth.

The purpose of the research project reported in this document is to assist the services in developing and improving programs that reach the college market. The project developed, implemented, and analyzed the results of a national survey of college youth. The survey offered respondents a series of hypothetical programs, and they were asked to rate their level of enlistment interest under each program. These programs were modeled after the Army's College First program, but varied the attributes of that program, such as the levels of college benefits and military pay and the requirements for participation. The survey data were analyzed to estimate the effects of different policy attributes on the stated level of enlistment interest. This document summarizes the final results of our study "Policy Options for Recruiting the College Market." It is intended for policy analysts and policymakers concerned about the success of military recruiting in the college market. The report builds on previous RAND studies including MR-984-OSD, *Attracting College-Bound Youth into the Military* by Beth Asch, M. Rebecca Kilburn, and Jacob Klerman and MR-1093-OSD, *Recruiting Youth in the College Market: Current Practices and Future Policy Options* by M. Rebecca Kilburn and Beth Asch.

This research was conducted for the Office of Accession Policy, Office of the Under Secretary of Defense for Personnel and Readiness within the Forces and Resources Policy Center of the RAND Cooperation's National Defense Research Institute, a federally funded research and development center sponsored by the Office of the Secretary of Defense, the Joint Staff, the unified commands, and the defense agencies. Comments are welcome and may be addressed to Beth Asch at Beth_Asch@rand.org. For more information on RAND's Forces and Policy Resources Policy Center, contact the Director, Susan Everingham, at Susan_Everingham@rand.org, or at (310) 303-0411, extension 7654.

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Summary

Military recruiting became more difficult in the late 1990s and the average recruiting cost per recruit rose across the services from \$7,600 in fiscal year (FY) 1996 to \$11,700 in FY 2001, according to the Directorate of Accession Policy in the Office of the Secretary of Defense. Yet despite the increase in the amount of resources devoted to recruiting, most of the services missed their recruiting goals in one or two years in the late 1990s, the first time since the late 1970s.

The reasons for these recruiting difficulties have been analyzed elsewhere (Asch and Orvis, 1994; Asch et al., 2002). One of the key factors explaining these problems is a fundamental shift in the U.S. labor market that has caused the earnings of those with a college degree to increase relative to those with a high school diploma. This change has increased the incentive to attend college and has therefore resulted in a steady increase in college enrollments among high school graduates, a figure equal to about two-thirds of high school graduates today, according to Department of Education statistics. As a consequence, the military's traditional recruiting market—high school seniors and recent high school graduates—has been diminishing in relative size compared to the size of the college market—high school seniors and recent graduates who are in college or have immediate college plans.

To respond to the rise in college enrollment as well as other factors making military recruiting more challenging, the services improved existing programs such as the College Fund and devised new programs to attract the college market. One type of new program was the college-before-accession program that allowed and, in some cases, subsidized individuals to attend college before they enter the military. The Army's College First program is an experimental program that repays up to \$65,000 in federal college loans, pays between \$250 and \$350 per month college stipend for two years of college, allows the individual to enter the military as an E-4, and makes these participants eligible for a "high-grad" bonus of \$8,000.¹ The Navy has programs such as "CASH" and "tech-prep" that provide benefits to enable individuals to attend college before they enlist in critical occupational areas, such as hospital corpsmen and the nuclear-related fields.

Such newly devised programs are an important step toward improving the attraction of military service to college market youth. However, these programs are only the first generation of policies. It seems prudent to plan for the future and consider what the second generation of programs that allow college before enlistment should look like. The research presented in this report provides information toward the development and improvement of such programs. Specifically, the questions we sought to answer were:

¹ The high-grad bonus was \$8,000 during the first year of the College First test in 2001, but was later raised to as high as \$12,000. The high-grad bonus has been reduced to as low as \$6,000.

- Within the context of a college-before-accession program, which policy attributes—pay, stipend, bonuses, or loan repayment—have the largest effect on enlistment propensity of the college market? Should the structure of the program emphasize bonuses, pay, stipend benefits, or loan repayment? How do requirements related to the individual's college major or their military career field affect propensity to enlist in college-before-accession programs?
- Does responsiveness to the different policy attributes vary by college market segment—high school seniors, college students, or recent college dropouts?²
- How do dropouts respond to direct enlistment programs relative to programs that allow them to return to college before enlistment?
- Which policy attributes are the most cost-effective?

Approach

The approach we took was to design and field a national survey of individuals, ages 17 to 21, who are in the college market, defined for the purpose of our study as individuals in one of three groups: college-bound high school seniors, current college students, and recent college dropouts. The survey, conducted in the winter of 2001, included many background questions but at its core was a set of 36 hypothetical policy programs that would allow individuals to attend college before entering the military.

Individuals were queried on their likelihood of enlisting under each hypothetical program where the likelihood could vary from a level of 1 (definitely not likely) to 7 (definitely likely). The hypothetical programs varied in terms of five policy attributes: (1) the level of military entry pay and enlistment bonus amount; (2) the amount and type of college stipend or benefit; (3) the length of time for which the benefit would be paid (two or four academic years); (4) the requirement regarding the type of college major the individual could pursue (academic or vocational); and (5) the requirement regarding the individual's entry military occupational specialty (technical or any for which the individual qualifies). The individual was told that he or she would be required to enlist for a four-year term of service and would be required to maintain at least a C average while in college. Because it was of interest to also consider how college dropouts would respond to a set of programs that allowed them to directly enlist in the military without first returning to college, we included 12 hypothetical programs for the college dropout sample. These additional 12 programs varied in terms of their level of pay, bonuses, and requirements regarding military career field.

To identify the survey participants, we used a randomly selected sample drawn from lists of current college-bound high school seniors (from the class of 2001) and of former college-bound seniors (from the class of 1999) provided by a list vendor. The current class list provided a sample of current college-bound high school seniors, and the older list provided a sample of current college students or recent college dropouts.

Comparisons between the demographic characteristics of the survey respondents and Department of Education statistics on college enrollees suggested that the college students in our sample were somewhat more likely to be female, white, and enrolled in a four-year college or university program. We therefore used post-stratification to control for gender, education, and ethnicity developed using data from the Current Population Survey and applied them to our survey data. We used these weights for the descriptive analysis and computed the predicted effects of alternative policies. Our regression analysis controls for background characteristics, thereby addressing the representativeness issue to the extent that is possible with our data.

² Throughout the report we use the term "college dropout" to refer both to individuals who have left college with no intention of returning and to "stopouts" who are individuals who left college temporarily but plan to return in the future.

We used the survey data to estimate an ordered logit regression model. The model provides estimates of the effect of each policy attribute (pay, bonuses, and so forth) on the probability of stating each level of enlistment interest (1 to 7). We use the estimated model parameters to predict the effect of alternative policies on the probability of expressing a positive level of enlistment interest (i.e., a level of 5, 6, or 7, the top three levels relative to a base case). Since the base case also represents a college-before-accession program, all of the policy estimates we make are relative to a program that is a college-before-accession option and is also a hypothetical policy.

Past studies indicate that there is a positive relationship between stated enlistment propensity and actual enlistment behavior (Orvis, Sastry, and McDonald, 1996; Bachman, Segal, Freedman-Doan, O'Malley, 1998). However, because there is some uncertainty about the exact relationship between propensity and enlistment rates, especially for the hypothetical programs in the survey, we have more confidence in our conclusions about the relative magnitudes of the effects of the alternative policies on enlistments than in our conclusions about their actual size.

Results on Policy Effectiveness

We find that the \$65,000 loan repayment program has a large effect on the probability that college market youth express a positive propensity to enlist. Offering the program increases the probability by over 50 percent. Using our regression model, we find that it would take a 35 percent pay raise, the enlistment bonus would need to increase to \$50,000, and the monthly stipend would need to be raised to \$2,100 per month to achieve the same effect as the Loan Repayment Program (LRP).³

That the LRP approach has such a large relative effect on stated propensity is somewhat surprising. The fraction of high-quality recruits enlisting with the LRP has historically been quite small, around 3.3 percent of high-quality Army enlistees in FY 1998.⁴ The low percentage reflects the low percentage of recruits with sizable federal student loan debt and the traditional allocation of recruiter effort towards youth in the high schools and not toward those with some college and the small level of resources devoted to the LRP in past years. For example, the Army budget for the LRP rose from \$22.9 million to \$30.2 million in FY 2000, according to budget figures provided by the Office of Accession Policy within the Office of the Secretary of Defense. Yet, the LRP budget was substantially smaller in FY 2000 than was either the Army's enlistment bonus budget (\$108.1 million), the College Fund budget (\$104.9 million), or the advertising budget (\$240 million).

It is possible that individuals responding to the LRP option in the survey did not fully comprehend that the benefit would only pay for federal loan debt, not any college debt, despite the fact that the survey question explicitly stated "federal student loans." On the other hand, the maximum benefit of \$65,000 under the LRP is larger than all of the college stipend options that we included in the survey. For example, the highest monthly stipend we offered was \$1,400 for 4 years of school (or 36 months, given that an academic year is 9 months). This stipend works out to be a total benefit of \$50,400—less than the \$65,000 maximum LRP benefit. Perhaps not surprisingly, then, the respondents were more responsive to the LRP benefit.

³ The results of our study indicate that the LRP option is highly promising relative to other college-before-accession approaches. It does not provide direct evidence on the efficacy of the Army's College First test relative to existing programs. Such an analysis would need to assess how the recruiting results in the test compare to those in the control cell, where the control cell only offers existing programs. Thus, to compute the effect of the Army's test program, one needs to understand how it compares to existing programs, including the LRP. That analysis is beyond the scope of this paper, but the issue is being investigated by another RAND study sponsored by the Army (Orvis, 2001).

⁴ The figure is based on analysis by John Warner at Clemson University using the Army's recruiting master file provided in verbal communication to the authors in 2000.

The high level of responsiveness to the LRP option in the survey suggests that the growth in the Army's LRP budget in recent years is sensible. As recruiters devote more effort to the college market and the program becomes better funded and more easily available, the survey results indicate that youth will find this option relatively attractive.

Relative to the stipend and enlistment bonus, pay had the largest effect on the probability of expressing a positive enlistment propensity while bonuses had the smallest effect. Our elasticity estimates of the effects on the probability of a 10 percent change in pay, bonuses and stipend benefits are remarkably consistent with estimates produced in studies of enlistment supply such as the one by Warner, Simon, and Payne (2001), despite the fact that supply studies use actual high-quality enlistments, not propensity, as their outcome variable and they focus on traditional enlistment programs, not the college-before-accession program. Specifically, we estimate that raising the bonus by 10 percent increases the predicted probability of responding in the top three categories by 1.0 percent relative to the base case. Raising entry pay by 10 percent is predicted to increase the predicted probability of stating a positive propensity level by 14.5 percent. Finally, raising the monthly stipend benefit by 10 percent is predicted to increase the predicted probability by 3.5 percent. The similarity of our results to earlier work gives us confidence about the validity of our results and the robustness of the supply studies' estimates of the effects of pay, bonuses, and college benefits. Our results also suggest that recent improvements in military pay will increase the attractiveness of the military to college market youth, including the college-before-accession option. They also suggest that the increases in the stipend benefits in the Army's test College First program from \$150 per month before FY 2002 to \$250 to \$350 per month beginning in FY 2002 will have a positive, although modest, effect.

We also found that on average requirements that narrow the individual's choice of college major or military career field had a negative effect on the probability of expressing a positive enlistment interest. This result does not imply that programs limited in size, such as the Navy's tech-prep or CASH program, will be unsuccessful. In fact, such programs that allow individuals to tie their college major with their military career field could increase enlistments from the college market. Instead, our results imply that broad application of such requirements across the college market will be met with less enlistment interest.

About 81 percent of the survey respondents who were college dropouts said they would like to attend college part-time or full-time in the future. To examine whether or not programs that allow dropouts to directly enlist were associated with a higher positive enlistment interest probability, our survey included hypothetical programs that would allow dropouts to directly enlist without first returning to college as well as programs that would allow them to first return to college. Both sets of programs offered higher pay and bonuses and, in some cases, had requirements regarding their military career field.

We found that the programs allowing dropouts to enlist directly without first returning to college were associated with a stronger stated enlistment interest level. Although the effect of the individual attributes of the direct-enlistment programs were not statistically significant at the conventional levels (except for the variable representing the career field requirement), the variables were jointly significant at the 5 percent level.

At first blush, these results seem to run counter to the first-year results of the Army's College First test. In the first year, the College First program expanded enlistments among individuals with less than a year of college by 43 percent. This group included current college students as well as recent college dropouts. However, among all high school graduates as well as among graduates with more than one year of college, there was no market expansion effect in the first year.⁵ Our sample of dropouts is comprised of individuals who have been out of high school for two years. Furthermore, we did not examine how college students respond to

⁵ Later results of the test, especially in years two and three, indicate an expansion effect of the College First program for graduates as well as seniors. (Information based on personal communication with RAND researcher Bruce Orvis, project leader of the study analyzing the College First test results.)

direct enlistment programs, so our sample of dropouts is not directly comparable to the graduates for whom an expansion effect was found in the test. Our analysis indicates that current efforts by the services to actively recruit dropouts to enlist in current direct enlistment programs are appropriate. Indeed, more than 20 percent of Army accessions now have some college experience according to the Army, a testament to the Army efforts to expand recruiting in the college market. The Army hopes to increase this percentage in the future.

The survey also provides corroborating evidence on the potential importance of college dropouts as a source of high-quality enlistments (Asch and Kilburn, 2002). Our analysis showed that college dropouts had a higher probability of expressing a positive enlistment interest in the college-before-accession programs. We find that the fraction expressing a positive propensity to enlist is higher on average for dropouts (41 percent) than it is for high school seniors (33 percent) or college students (29 percent) in response to the hypothetical propensity questions. We also find that they are more oriented toward the world of work in terms of their future plans than are college students or high school seniors. For example, only 40 percent of dropouts but 83 percent of high school seniors said they planned to go to college full-time in the next few years. In contrast, 60 percent of dropouts but only 11 percent of seniors said they planned to work full-time in the next few years.

However, nearly all of the differences in propensity across college market groups were due to differences in background characteristics. In other words, when we controlled for background characteristics, dropouts had interest probabilities similar to the college-bound seniors and college students. Dropouts are more likely to be employed and less likely to have attended an academically oriented high school or to have achieved higher grades, and these characteristics are positively associated with enlistment interest levels.

The survey also confirms earlier findings that suggest that many dropouts leave college for financial reasons rather than because of poor health or poor grades, two factors that might result in their ineligibility to enlist. For example, we find that 39 percent of the dropouts said they left college without a degree because they lacked the money to continue while only 3 percent cited poor health and only 15 percent cited poor grades. The lack of financial resources suggests that some dropouts might be receptive to programs that offer them resources to attend college, such as the College Fund, the MGIB, tuition assistance, or even a college-before-accession program.

We also investigated whether specific groups were more or less responsive to changes in pay, bonuses, stipend benefits, and other policy attributes. The groups we considered were college market segment (dropout, senior, college student), gender, and race/ethnicity. The only consistent group difference was gender. In general, we found males more positively responsive to pay, bonuses, stipend benefits, and the LRP and less negatively responsive to requirements regarding college major or military career field. As males are the traditional target recruiting market, these results are encouraging. We also found that the negative effect of military career field requirements was particularly large for the college dropout group. It may be the case that this group has a clearer understanding of the implications of this requirement because they are more likely to be employed and are therefore more attached to their working conditions. This result suggests that college-before-accession programs that channel individuals into specific military career fields will have more limited success with college dropouts than other college market youth.

Result on Cost-Effectiveness

We computed rough marginal cost estimates of the different policy attributes. We find that to produce a given increment in enlistments using the college-before-accession approach, the loan repayment program is the most cost-effective in general and pay is the least cost-effective. Because we examine hypothetical options and have no information about the actual enlistment rates under these programs, we made a series of assumptions to compute cost and conducted numerous sensitivity analyses to see if our conclusions were sensitive to specific

assumptions. Regardless of whether we assumed higher or lower enlistment rates, discount rates, or benefit take rates, we consistently found the loan repayment program the most cost-effective policy attribute.

The only exception to this conclusion is when we made an alternative assumption about the amount of the dollar loan repayment benefit recipients actually used. In most of our computations we assumed that LRP recipients used only 25 percent (or about \$16,000) of the LRP benefit. This figure was based on actual Army LRP usage rates in FY 2000. The reason the LRP was found to be so cost-effective was because enlistment interest among the survey's college market youth was highly responsive to the \$65,000 dollar benefit, yet the cost of the benefit was fairly modest because we assumed they only used \$16,000 of the benefit. When we assumed a substantially larger usage rate, equal to 75 percent rather than 25 percent, the LRP was no longer found to be more cost-effective than bonuses and stipend benefits. Thus, at current usage rates, our study suggests that the loan repayment program is the most cost-effective tool to expand college market enlistments, but not at high rates.

The Role of Recruiter Effort and a College Recruitment Infrastructure

The survey responses we obtained came directly from potential military recruits. Therefore, our analysis completely sidesteps two important factors that have been shown to influence military recruiting success. Those factors are recruiter effort and the role of recruiter management. Past studies have shown that recruiter effort and the incentive mechanisms used to motivate recruiter effort, such as monthly goals and incentive plans, affect the success of different recruiting policies. The services will not fully realize the gains in enlistments associated with policies such as expanded bonuses or advertising budgets unless recruiters are motivated to allocate their effort towards the enlistment of high-quality recruits.

These studies show the importance of recruiter management and, more generally, the importance of the recruiting infrastructure in achieving success of new programs. The lesson we draw from these studies is that the services will need to ensure that the appropriate infrastructure is in place if they are to be successful in the college market. For example, it is crucial that recruiters have an incentive mechanism that rewards them for success in the college market, even if it means that recruits are in the Delayed Entry Pool (DEP) for extended periods of time while they attend college. Furthermore, the services need to ensure that advertising campaigns support recruiters' efforts in the college market. They also need to ensure that recruiters are selected, trained, and provided the necessary resources to enable them to succeed in this new market. To the extent that such an infrastructure is not entirely in place, policies to recruit the college market, including those discussed in this report, will not realize their full potential. Therefore, it is of critical importance to devise not just new policies and benefits for college market recruits, but also a management infrastructure that ensures those programs' success.

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List of Abbreviations

AAPOR	American Association for Public Opinion Research
AFQT	Armed Forces Qualification Test
ASL	American Student List
CPS	Current Population Survey
DEP	Delayed Entry Pool
DMDC	Defense Manpower Data Center
DoD	Department of Defense
FY	fiscal year
GPA	grade point average
IG	incentive group
LACC	Los Angeles City College
LRP	loan repayment program
MGIB	Montgomery GI Bill
MtF	Monitoring the Future
NCES	National Center for Educational Statistics
NDAA	National Defense Authorization Act
OMB	Office of Management Budget
QRMC	Quadrennial Review of Military Compensation
RMC	regular military compensation
RR	response rate
SMC	Santa Monica City College
YATS	Youth Attitude Tracking Study
YOS	years of service

Introduction

Recent and long-term trends in the military and the civilian economy from which the military draws recruits underscore the importance of recruiting from the college market to successfully meet the manpower requirements of the armed forces in the future.

The military's traditional recruiting market, namely high school graduates with no immediate plans to attend college, has been shrinking in relative size since 1980 as college enrollment rates among high school graduates have risen. Today, about two-thirds of high school graduates attend college within a year of graduation (U.S. Bureau of the Census, 2000). Consequently about one-third of high school graduates fit the military's traditional description of a new recruit. Further highlighting the importance of the college market for military recruiting is available evidence indicating that youth who score higher on the Armed Forces Qualification Test (AFQT) are more likely to attend college and less likely to enlist, all else equal (Kilburn and Klerman, 1999; Orvis and Gahart, 1989; Hosek and Peterson, 1985). Since the military prefers to recruit youth who score well on this test, this evidence suggests that successfully recruiting from the college market will be essential for the military.

The services have long recognized that college opportunities are a source of potential competition for new high school graduates. However, the effects of long-term trends in military pay relative to civilian pay, together with the effects of extremely low unemployment and a strong civilian economy in the 1990s, made this competition fiercer in the late 1990s. College graduates have enjoyed significant wage growth in the civilian labor market relative to high school graduates since the late 1970s (Kane and Rouse, 1995; Lehigh and Gill, 1997). While military pay has also grown over the last two decades and has generally been competitive with the pay of civilians with a high school degree, military pay has been less competitive with the civilian pay of those with some college (Asch, Hosek, and Warner, 2001).

Partly reflecting these trends, the armed services struggled to meet their recruiting goals in the late 1990s. The Army and Navy fell short of their recruiting goals in fiscal year (FY) 1998, and the Army and Air Force fell short in FY 1999. Such outcomes are rare: the last time a service fell short was in the late 1970s, a period of time dubiously named the age of the "hollow force." In addition to missing their goals, recruit quality had been falling across the Department of Defense (DoD) since 1990. Although the services met their quantity goal in FY 2000, recruit quality continued its decline.¹ For example, in FY 1995, 67 percent of recruits were high quality. This figure had fallen to 58 percent in FY 2000. In part because of a softening economy, the

¹ A high-quality accession is defined as a recruit who is a high school diploma graduate who scores in the top half of the test score distribution of the AFQT.

figure rose in FY 2001 to 61 percent (Asch, Hosek, Arkes, Fair, Sharp, and Totten, 2002).² In 2002, all of the active components met their recruiting goals. Still, competition for college market youth remains as the armed services seek more college market youth. Currently, the Army goal is to have at least 25 percent of their accessions be individuals with some college experience.³

To compete more effectively for high-quality recruits and improve military recruiting outcomes overall, the services have sought to improve existing policies and to develop new policies that will attract the college market. For example, Congress passed legislation that allowed the services to offer both enlistment bonuses and college fund benefits to the same recruit. Furthermore, several bills have been introduced in recent years to significantly enhance the Montgomery GI Bill (MGIB) benefit. Under the MGIB and the College Fund, individuals typically serve in the military and then usually attend college following their service obligation.

The services have been developing entirely new types of programs that allow individuals to attend college prior to enlistment. The Army is testing a "College First" program that permits high school graduates to attend college for up to two years before enlistment. Until FY 2002, the Army paid a stipend of \$150 per month, repaid up to \$65,000 in federal student loans, offered an \$8,000 "high-grad" enlistment bonus, and allowed individuals to enter the Army at a higher pay grade. In the National Defense Authorization Act (NDAA) for FY 2002, the program was modified. The stipend was increased to \$250 in the first year and \$350 in the second year to match the Army's ROTC program. The loan repayment program (LRP) part of the test program was eliminated and the bonus was increased to \$12,000, although the bonus was later reduced to as low as \$6,000. For FY 2003, the \$65,000 LRP was restored and the higher stipend amounts were maintained. The Navy has two programs that permit youth to attend college prior to enlistment. Both programs seek to expand enlistments in critical skill areas, such as the nuclear fields and hospital corpsman field. The first program, the Navy's "tech-prep" program, is aimed at high school seniors. Qualified seniors attend college during their senior year. After receiving their high school diploma, they attend community college for one year. They then enter the Navy and complete their associates degree by the end of their first enlistment term, often getting college credit for Navy training (Golfin, 1998). The other program, the Navy's "CASH" program, is targeted to high school graduates who attend community college full-time for one year, earning basic pay during this time, and then enter the Navy in a nuclear field and complete their associates degree by the end of their first enlistment term.

These new policies represent only a beginning in terms of the services' efforts to become fully engaged in the college market. Like any new program, in both the military and in the private sector, these policies need to be fine-tuned and further developed to take account of new information obtained from research and from the services' experiences in recruiting from this new market. Furthermore, because the college market is not homogeneous but represents a diverse group of college-bound high school seniors, college students, dropouts/stopouts, and graduates who have different attitudes and aspirations, it seems plausible that more than one type of policy will be effective in recruiting the college market. It is therefore useful to examine how current policies aimed at attracting college market youth might be expanded, refined, or otherwise improved.

The research project discussed in this report sought to provide analysis that supports the services' effort to design programs that allow youth to attend college before accession. Our method involved designing, implementing, and analyzing the results of a national survey of youth, ages 17 to 21, in the college market. We define the college market to include three groups: high school seniors with immediate plans to attend col-

² These figures for FY 2000 and 2001 exclude individuals who enlisted under the Army's GED Plus program. GED Plus is a test program that permits the accession of up to 4,000 non-high school graduates into the Army each year. These individuals must have scored in the top half of the AFQT distribution and in the top 75 percent of the Assessment of Individual Motivation test. Because these individuals are not traditional high school diploma graduates, they are not deemed high quality by the standard definition.

³ Based on conversations with staff from the missioning branch of the U.S. Army Recruiting Command, May 2003.

lege, college students, and those disenrolled from college and who have no degree (i.e., college dropouts and stopouts).

The survey sought to ascertain the level of enlistment interest among individuals in the college market under a series of alternative hypothetical policy programs that would allow them to attend college prior to a four-year enlistment obligation. The hypothetical programs are roughly modeled after the Army's original College First program, but offer different and, in most cases, more generous levels of college benefits, entry pay, and bonuses, and they may have different requirements for eligibility for receiving these benefits. The programs vary the level of five different attributes, as follows:

- the level of entry regular military compensation (RMC) and, in some cases, a level of entry bonus
- the level and structure of the college benefit
- a college benefit that would last for either two years of college or for four years of college
- the requirement that individuals choose a college major in a particular area of study
- the requirement that individuals enlist in a particular career field.

In total, the survey included 36 hypothetical policy program options that represent different combinations of these five attributes. Survey respondents are asked to rate their enlistment interest, on a scale of 1 to 7, under each program. Since 36 programs seemed overly large and seemed likely to result in a lower response rate, we spread the 36 programs across four different survey instruments that were identical, except for the particular hypothetical programs. Survey instruments were randomly assigned to individuals. Thus, each respondent was asked to rate nine different options. Before listing the different options, the survey indicates that all of the options would allow college before accession. Respondents were told that their enlistment obligation would be four years and individuals would be required to repay, on a prorated basis, the college benefit and enlistment bonus if they failed to meet the obligation. They were also told that they would be required to maintain at least a C grade point average while in college.

In addition to the 36 policy programs, we also examined the enlistment interest among college dropouts in 12 options that would not require college prior to enlistment. These programs would allow dropouts to enter the military immediately at higher military pay, higher bonuses, and with the potential of a requirement regarding their military career field. We considered these additional programs, at the request of the Office of the Secretary of Defense, because dropouts might not be interested in a program that required that they return to college prior to enlistment. We also considered them because the armed services would be interested in the immediate enlistment rather than the deferred enlistment of these individuals. Therefore, dropouts faced 48 (36 + 12) programs, spread across the four survey instruments, rather than the 36 programs.

The objective of the survey is to provide answers to these questions:

- What is the best overall program structure for recruiting college market youth with a college-before-accession approach? Should there be greater emphasis on stipend benefits, loan repayment, higher pay, or higher entry bonuses? The Army has adjusted its College First program by changing its loan repayment and stipend features. What is the effect of these features on enlistment interest? Also, the services typically offer higher pay to enlistees who enter the military with more education. For example, the Army's general policy is to allow those with two years of college to enlist in pay grade E-3 rather than in grade E-1, the entry grade for the typical high school graduate. However, given the significant wage gains for those with some college in the civilian labor market, the E-3 and E-1 differential might not be large enough. In fact, Asch and Kilburn (2002) show that the increment in expected first-term compensation as a result of entering as an E-3 is just slightly greater than the expected compensation that results from entering as an E-1. In addition, higher aptitude youth are more likely to seek a four-year college degree, and the relative wage gains in the civilian labor market for those with a four-year degree have been far greater than the

gains for those with a two-year degree (Asch, Hosek, Warner, 2001). The Army's experimental College First program allows entry as an E-4 and has provided a "high-grad" bonus of as high as \$12,000. Yet entry as an E-4, even with a \$12,000 bonus, may still be insufficient to attract the college market. Should entry pay or the entry bonus be even higher to attract the college market?

- Which of the several alternatives—pay, bonuses, stipend, or loan repayment benefits—provides the most cost-effective means of enriching college-before-accession recruiting incentives among college market youth? Cost-effectiveness will depend on the enlistment effects of these programs and their relative cost. Cost, in turn, will depend on the dollar value of the benefits as well as when they are paid out. Because of the discounting of future costs, benefits that are paid later, such as bonuses and pay, have a lower cost for the same dollar amount as benefits paid earlier such as stipend benefits.
- Does the responsiveness of the college market to financial recruiting incentives vary among different segments of the college market? Available evidence suggests that college students differ from college dropouts in their characteristics and their enlistment potential (Asch and Kilburn, 2002). For example, lack of financial aid is a predictor of the likelihood an individual drops out of college. Consequently, dropouts might be more responsive to programs that provide more generous college benefits. On the other hand, if dropouts leave college because they realize that they are not well suited for this pursuit, offering more generous college benefits may have no effect. College-bound high school seniors are another segment of the college market that could be receptive to enlistment incentives, as are current college students who may be seeking employment opportunities following their college years.
- Is youth interest in the military enhanced or diminished if they are required to enlist in particular occupational specialties? Would they prefer more flexibility in their choice of career field? As mentioned earlier, the new Navy programs focus on expanding supply to specific technical areas. In contrast, the Army allows individuals who enroll in the College First test program to choose any occupation for which they qualify and in which there is availability.
- Is youth interest in the military enhanced or reduced by a requirement to major in a particular area of study? Some college majors are directly applicable to some military occupations, and military and college training overlap to a considerable degree. For example, requiring youth to major in programs that enable them to pursue a career as medical technicians or X-ray technicians could enable the Navy to "fast-track" the training and delivery to the fleet of proficient hospital corpsman. Furthermore, depending on the relative cost of college and in-service training, the cost of Navy training might be reduced. On the other hand, youth in the college market might view a constraint of their major as particularly onerous and their enlistment interest might become even more negative.

The use of hypothetical alternatives in surveys to ascertain preference levels for different attributes of potential programs has been used in a variety of contexts in other studies. Market research firms commonly use this method to understand how consumers would value different attributes of potential new products and which attributes they most value. In the marketing literature, the method is called "Conjoint Analysis" (Green and Srinivasan, 1990; Huber, 1987; Green, 1984; Green, Carroll, and Goldberg, 1981; Fiedler, 1972). Policy analysts have also used this method to evaluate how various citizen groups would value alternative government projects, such as new transportation systems (Hunt, Abraham, and Patterson, 2002), alternative housing arrangements (Fiedler, 1987), and new health care plans (Marquis et al. 1988). The method of inferring how individuals value program attributes based on responses to a series of hypothetical alternatives has been used in the military context as well. Daubert, Relles, and Roll (1982) use this method to study how medical students would respond to alternative military education and tuition benefits. Kraus, Griffis, and Golfen (2000) use the method to analyze how potential military recruits would respond to alternative Navy enlistment incentives.

Buddin et al. (1999) use the method to study how military personnel would value alternative housing arrangements and benefits.

The survey approach used here has advantages and disadvantages. The main advantage is that a survey can include hypothetical policies that permit an analysis of youth enlistment interest in entirely new and untried policies that are yet to be implemented. Administrative data or experimental data only permit analysis of policies that currently exist. Furthermore, the survey approach allows the examination of a large number of untried options. Experimental approaches allow only the examination of a smaller number of options. Surveys are also less costly and quicker than multiyear experiments. Surveys, therefore, provide less costly input about a large number of untried options.

The survey approach also has disadvantages. First, individuals are being queried about hypothetical policies and are not making real choices. Their reaction to real choices may differ from their response to a survey. On the other hand, available evidence on the relationship between the level of enlistment propensity stated in the Defense Manpower Data Center's Youth Attitude Tracking Study (YATS) and enlistment rates actually observed by the services indicate that although the relationship is not one-for-one, the relationship is positive and strong. That is, those who state a stronger propensity to enlist in the survey enlist at a higher rate when faced with the actual enlistment choice (Orvis and Gahart, 1989; Orvis, Sastry, and McDonald, 1996; and Bachman, et al., 1998). Therefore, it is likely the level of enlistment interest expressed in this survey research project will map in a positive way to actual enlistment behavior, although a priori, the exact relationship cannot be determined.

Second, the survey approach does not allow us to analyze enlistment interest controlling for other factors that influence enlistment interest, independent of the hypothetical policy attributes. For example, the level of advertising or level of recruiter effort can vary regionally and can affect enlistment interest and supply in a way that is independent of the college benefits and entry pay and bonuses offered by the services. Although the analysis includes some controls for background characteristics, such as gender, race, ethnicity, and family income, it does not control for all of the relevant factors that affect enlistment interest, especially other recruiting resources and recruiter management. On the other hand, even data from actual recruiting experiments do not necessarily have all of the relevant information either.

This report is organized as follows. Chapter Two discusses the survey questionnaire with particular emphasis on the hypothetical policy programs and how they were developed. Chapter Three describes the survey design, the sample size computations, the methods used to administer the survey, and the response rates. Chapter Four discusses the analytical method used to estimate the relationship between the policy attributes of the hypothetical programs and stated enlistment intention. In Chapter Five, we present a descriptive analysis of the data with a particular emphasis on describing youth attitudes toward the military and their future plans. Chapter Six discusses our regression results, and Chapter Seven presents some rough cost-effectiveness estimates of alternative policy programs. We provide closing thoughts and policy implications in Chapter Eight. The report also includes several appendices that provide a copy of the survey instrument, a summary of the survey pretest and focus group results, and other ancillary results.

Survey Questionnaire

The data for our study comes from a national survey of young adults in the college market. This chapter describes the development of the survey instrument. The questionnaire included six sections that appeared in the following order: (1) eligibility screening questions; (2) future plans; (3) hypothetical policy programs; (4) paying for college; (5) employment status; and (6) background information. Because the hypothetical policy programs were the core of the survey and the section of primary interest, we devote most of the discussion in this chapter to the development of this section of the survey and the specific policy attributes of the programs. A copy of the survey instrument is provided in Appendix A.

Hypothetical Policy Programs

The survey included 36 programs spread across 4 different versions of the instrument. An additional 12 programs were also administered to the dropouts in our sample and spread over the four versions of the instrument. These additional programs allowed dropouts to enlist without returning to college. Each program had the same structure—it allowed individuals to attend college before accession. However, the programs differed along five dimensions or policy attributes, as discussed below. Each combination of policy attributes defined a different program.

Before the specific programs were presented, the following introduction was given to the survey respondents:

We'd like your opinion on nine new programs that the military might offer in the future, even if you don't plan to enter the military in the next few years. Their purpose is to interest people like yourself in military service by offering them the opportunity to obtain a college degree before enlisting in the military. For those who are disenrolled from college, it would offer an opportunity to return to college and obtain a degree before enlisting.

Each program includes the following:

- a scholarship benefit to help pay for college
- for those completing two years of college, a higher starting military salary than what is currently offered to those enlisting without any college.

The programs differ in the level and type of college benefit, the starting military salary and entry bonus levels, your required college major, and your military career field.

Each program would require the following:

- full-time enrollment and a minimum C GPA while in college
- completion of at least two years of college
- military enlistment within three months of finishing school
- completion of four years of active military service.

Those who don't meet the requirements would have to repay the scholarship benefit and entry bonus if one is received.

Development of the Policy Options

To develop the five specific policy attributes, we initially sought input from individuals knowledgeable about military recruiting, recent service initiatives to recruit from the college market, and the career decisions of youth in the college market. We spoke with individuals familiar with recruiting in the Navy and Army because both services had recently developed new programs to recruit youth from the college market. Consequently, they seemed the most likely to have considered what new programs might be tried. Specifically, we held discussions with the Director of Research at the Navy Recruiting Command and with researchers at the Center for Naval Analyses who have worked with the Navy to develop its Navy tech-prep program. Within the Army, we visited the Army's Recruiting Command and met with the Director of the Policy Analysis and Evaluation group, the Director of Recruiting Operations, and individuals familiar with the Army's educational programs. We also met with the Director of Enlisted Accessions within the Office of the Army Deputy Chief of Staff for Personnel. In addition to these discussions, we also met with individuals in the Office of Accession Policy within the Office of the Secretary of Defense. Also, to ascertain whether it would be useful for the development of the hypothetical programs to hold extensive discussions with career counselors on college campuses, we spoke to career counselors at two individual two-year college campuses in the Los Angeles area.

While the individuals that we met were extremely knowledgeable about existing programs to reach the college market and agreed that more information was needed on the effectiveness of new programs, they provided relatively little guidance on how to design specific hypothetical policy programs for our survey. Consequently, we came to the conclusion that we would have to develop an array of options based on our own judgment of what might be feasible from the military's perspective and what might be attractive to the college market.

We therefore modeled the structure of the policy options after an existing but experimental program, the Army's College First program, for three reasons.¹ First, earlier research documenting youth labor market trends and the characteristics of college market youth (Asch and Kilburn, 2002; Kilburn and Klerman, 1999) indicated that programs that allow college before accession, rather than following enlistment, might be attractive to high-quality youth (Golfin, 1998). Second, the Army's College First program is potentially attractive to college-bound high school seniors, college students seeking financial aid and career opportunities following college, and even college dropouts who might consider returning to school at some point. In contrast, the Navy's programs (such as tech-prep) are more focused on expanding enlistments among college-bound high school seniors. Since the objective of our project was to examine programs that might be attractive to college students and dropouts as well, the Army's program seemed more appropriate. Third, preliminary results from the experimental College First program suggested that the program might be improved or fine-tuned in some ways. Based on the first-year results of the College First test, Orvis (2001) concludes that the college stipend of \$150 per month should be raised to be comparable to the stipend available to ROTC participants.

¹ We modeled the structure of the hypothetical programs after the original Army College First program. Subsequent to the survey, the National Defense Authorization Act (NDAA) for FY 2002 changed the program by increasing the stipend levels but withdrawing the loan repayment part of the program. As described in Chapter One, the LRP was restored for FY 2003.

All of the hypothetical policy programs were built around the College First model that allows qualified youth to attend college (while receiving a military stipend) before enlistment. Each program had five attributes that are discussed in more detail below. The programs differed from the Army's initial College First program in several ways. The stipend level was considerably higher than the Army's program, the level of entry pay varied (and was substantially higher in some cases), and the college stipend was paid up to four academic years, not just for two academic years like the Army's program. The hypothetical programs also incorporated some of the features of the Navy's programs. In some cases, individuals were told that they would be required to major in a vocational area rather than any area and they would be required to enter a technical career field upon enlistment rather than any field for which they qualified.

We also met with two career counselors at local community colleges in Los Angeles. Because we did not learn a significant amount from them in terms of how the hypothetical policy programs might be structured, we decided not to extend the interviews to a larger group of counselors in other areas. Nonetheless, the counselors had some interesting thoughts on college student attitudes toward the military. Although these thoughts are not representative, in any sense, they might be of interest to those concerned with recruiting on college campuses. We summarize the results of our interviews with them in Appendix B.

The next subsections provide details on the five attributes of the hypothetical programs and the levels of those attributes.

Attributes of the Policy Options

The first three attributes pertained to college and the second two pertain to enlistment.

College Attributes. The first attribute was the college major requirement. As indicated in Table 2.1, this attribute had two levels. The first required that the individual pursue a college major that is more vocational than academic. Examples of a vocational major include engineering, computer science, electronics, health, mechanics, and so forth. The second level allowed the individual to pursue any major, academic or vocational, that eventually results in either an associate or baccalaureate degree.

Table 2.1
Policy Attribute 1: College Major Requirement

Level 1	Level 2
Follow a course of study that is more vocational than academic.	Would not be required to follow a particular course of study, but would be required to be seeking a college degree.

The second college attribute was the college benefit the military would provide to those who maintain a C average in college while enrolled full-time and who enlisted in the military for a term of service of four years. The nine levels of this attribute are shown in Table 2.2. The first level was loan repayment and a stipend, which was modeled after the Army's College First program. Individuals would be able to get up to \$65,000 of federal loans repaid. In addition, they would receive a \$150 per month stipend for two academic years. The remaining levels provided a stipend benefit that is more similar in structure to the MGIB and the College Fund in that they offered a monthly stipend for a period of time while participants were enrolled full-time in a degree-seeking college program. They differed from the MGIB in that the benefit would be received before the individual gains access into the military. The stipend could be used to cover tuition, books, or living costs.

The third college attribute was the time period over which the benefit would be received, either two or four academic years. Table 2.2 shows how the levels varied in the dollar amount of the stipend and in the

Table 2.2
Policy Attributes 2 and 3: College Benefit and Number of Years Offered

Attribute Level	Benefit	Number of Academic Years Offered
Level 1	\$65,000 federal loan repayment	Two years
Level 2	\$600 per month stipend	Two years
Level 3	\$600 per month stipend	Four years
Level 4	\$900 per month stipend	Two years
Level 5	\$900 per month stipend	Four years
Level 6	\$1,200 per month stipend	Two years
Level 7	\$1,200 per month stipend	Four years
Level 8	\$1,400 per month stipend	Two years
Level 9	\$1,400 per month stipend	Four years

maximum number of months or years for which the individual could get the benefit. The monthly stipend levels varied from \$600 to \$1,400 per month, and the time periods varied from two academic years to four academic years.

To develop the different stipend levels in Table 2.2, we consulted available data sources and statistics on the cost of college attendance. Presumably, a meaningful college benefit from the military would cover a significant fraction of the direct or indirect costs of attending college. These costs included not only the cost of tuition, books, and living expenses, but also the opportunity cost of a student's time. The opportunity cost represents the amount the individual might have earned in the labor market had he or she been working rather than spending time attending school.

Table 2.3 presents estimates of postsecondary schooling costs obtained from published Department of Education data and from other research available at the time we were developing the survey. The table shows the average total cost per academic month of attending different postsecondary institutions. Average total cost per academic month was defined as the average tuition, books, fees, and living costs associated with attendance for a full academic year divided by nine months, which is the length of an academic year. The table also shows estimates of the opportunity cost of attending college. The table shows the full-time earnings per month of a male with one year of labor market experience with a high school degree and some college experience.² Since many students work while attending college, these estimates are an upper bound of the opportunity cost. To compute full-time earnings per month, the annual earnings figures are divided by 12 months, the length of a calendar year.

Given that the survey sample would primarily include individuals who planned to attend, were currently attending, or were formerly attending a two-year or a four-year college or university, the table presents average college costs for different categories of schools, expressed in 2000 dollars. The table ignores the cost of attending one-year certification programs because earlier research suggests that most of these students are older or are female and are not part of the military's key recruiting target market (Asch and Kilburn, 2002). The average cost of attending any two-year or four-year college or university (private or public) is estimated to be \$1,106 per month. The figure varies considerably when the definition is limited to two-year versus four-year schools and private versus public schools. The average cost per month of attending a four-year public university is \$915 per month, far less than the average cost of \$2,281 per month of attending a four-year private university. The average cost of attending either a four-year university or college (private or public) is \$1,352 per month.

² Full-time is defined as working at least 30 weeks and averaging 35 or more hours per week. The earnings figures are based on regression analysis using March 1994–1999 Current Population Survey data. These data were used to produce civilian profiles for individuals who are comparable in terms of observable characteristics as military members (provided by John Warner in personal communication with authors 2001).

Table 2.3
Educational Costs, in 2000 Dollars

Type of Cost	Amount per Month
Direct Cost ^a	
Four-year public college	\$916
Four-year private college	\$2,281
Four-year all college	\$1,352
Two-year public college	\$528
Two-year all college	\$603
All Two-year and Four-year colleges	\$1,106
Indirect Cost ^b	
High school graduates	\$1,335
Males with some college	\$1,373

^aDirect costs are the average total cost per academic month (U.S. Department of Education, Table 317, 2001.). The Department of Education figures are for academic year 1998–1999. They were converted to 2000 dollars.

^bIndirect costs are the average annual 2000 earnings per calendar month for full-time males with one year of labor market experience computed from the Current Population Surveys and converted to 2000 dollars (John Warner, 2000).

As expected, two-year colleges are less expensive. Most of these colleges are public. The average cost of attendance per month at a public two-year college is estimated to be \$528 per month while the cost of attending any two-year college (private or public) is somewhat more expensive, equal to \$603 per month.

As previously mentioned, the direct cost of attending school is only part of the total cost of attendance. The opportunity cost of the student's time can represent a considerable fraction of the total cost. The table shows the monthly earnings of a full-time high school male graduate with one year of experience and the monthly earnings a full-time male with some college and with one year of experience. The monthly earnings are \$1,335 and \$1,373 respectively. Since many students work, helping to reduce the opportunity cost of school attendance, and some attend school while living with their parents or guardians, these figures are upper bounds.

To arrive at the total cost per month of attending school, it is necessary to add the direct costs of attendance with the opportunity costs. Given the wide range of direct cost estimates, the sum also takes a range, from a minimum of \$1,863 (equal to \$528 + \$1,335) of attending a two-year public college full-time (without working part-time) to a maximum of \$3,654 (equal to \$2,281 + \$1,373) of attending a four-year private college full-time (without working part-time). While these figures provide a range of cost figures that give a sense of what level of financial aid benefit the military might offer that would be meaningful to students, there is no clear method of choosing which specific cost figure should be used in the survey. It seemed reasonable to choose levels in the survey that covered most of this range and yet seemed reasonable in terms of what the services might realistically adopt and what is currently offered by the ROTC programs and MGIB. The latter two programs give an indication of what might currently be viewed as reasonable and serve as a baseline. At the time of the development of the survey, the MGIB offered a maximum benefit of \$552 per month. The ROTC scholarship programs varied across service. The Army program offered up to \$16,000 per year or \$1,778 per month for ROTC participation in the most elite schools at the time we were designing the survey. Given these figures and the range of costs shown in Table 2.3, we arrived at the levels shown in Table 2.2. They seem to cover a reasonable part of the overall range of costs. Finally, the levels we chose seem reasonable based on past research on factors to consider when developing the optimal levels for different attributes. For example, the literature on conjoint analysis indicates that it is appropriate to have multiple levels (as in Tables 2.2 and 2.5)

when the attributes are particularly important (Wittink, et al., 1992). Thus, we have nine levels for the stipend benefit in Table 2.2 and for the pay and bonus benefits shown in Table 2.5 later in this chapter.

Military Enlistment Attributes. The fourth attribute, an enlistment attribute, pertained to the occupational requirements upon entry into active service. As indicated earlier in the chapter, all individuals were told that they would be required to enlist in one of the four services for at least four years. However, as shown in Table 2.4, the occupational requirement had two levels. The first level required the individual to enter a technical occupational area, such as computers, engineering, mechanics, avionics, electronics, and so forth. The second level did not have an occupational area requirement and simply required individuals to enter an occupation in which they would be qualified and in which a slot or training seat would be available at the time of accession.

Table 2.4
Policy Attribute 4: Occupational Requirement

Level 1	Level 2
After entering the military, the individual would be required to enter an occupation in a technical area, although there would be a choice as to the specific occupation.	The individual would not be required to enter a particular occupational area. The individual would have the choice of a specific occupation among those for which he or she qualified.

The fifth and final attribute pertained to regular military compensation and the bonus level upon entry to active duty. RMC is defined by the military as the sum of basic pay, the basic allowance for subsistence, the basic allowance for housing, and the tax advantage associated with receiving allowances on a tax-free basis. RMC is considered to be the military's equivalent to earnings in the civilian economy. The pay attribute had nine levels that varied both the level of RMC and the level of the bonus amount. In some cases, the bonus was set to zero to allow us to examine pay separately from the receipt of the bonus. Although not explicitly mentioned to the survey participants, we modeled the concept of the bonus in the survey after the Army's high-grad bonus. This bonus is targeted to high-quality recruits with some college.

The RMC levels, rounded to the nearest thousand dollars, were average RMC levels for the year 2001 for different grade and years of service (YOS) combinations in the enlisted pay table. Table 2.5 shows the nine specific RMC levels, the bonus levels where applicable, and the corresponding grade-YOS combination in the 2001 enlisted pay table.

Table 2.5
Policy Attribute 5: Entry Military Pay and Bonuses

Attribute Level	Benefit	RMC at Grade-YOS Combination ^a
Level 1	\$25,000	E3 at YOS 1
Level 2	\$26,000	E3 at YOS 1
Level 3	\$28,000	E3 at YOS 1 plus 5 percent raise
Level 4	\$29,000	E3 at YOS 1 plus 10 percent raise
Level 5	\$30,000	E3 at YOS 1 plus 15 percent raise
Level 6	\$25,000 plus \$5,000 bonus	E3 at YOS 1
Level 7	\$25,000 plus \$15,000 bonus	E3 at YOS 1
Level 8	\$25,000 plus \$25,000 bonus	E3 at YOS 1
Level 9	\$25,000 plus \$35,000 bonus	E3 at YOS 1

^aThe RMC figures are rounded from the January 1, 2001, pay table. They are rounded to the nearest thousand dollars, as recommended by the pretest participants.

As can be seen from Table 2.5, some levels included RMC alone, others included the RMC of an E3 at YOS 1 plus a bonus. Bonuses are included as well as RMC because of input we received from members of the 9th Quadrennial Review of Military Compensation (QRMC) working group, a group of civilians and military members providing input and support for DoD's 9th QRMC. As mentioned earlier, we got input from numerous sources to develop the policy attributes and their levels. During a discussion of how the military might better attract the college market, the QRMC working group debated the relative merits of offering higher entry pay versus higher enlistment bonuses. Several of the military members, representing the compensation directorates from each of the armed services, indicated that a bonus was preferable to higher entry pay from the services' perspective. Some group members were concerned about pay compression and the resulting negative perceptions about equity among service members if entry pay was increased without a pay increase for more senior personnel. They were also concerned that individuals who enter service as an E4 or as an E4 with two years of service would not have the necessary skills to satisfactorily perform their duties. It was their view that these problems would be addressed if recruits with college experience entered the military as an E3 but received a bonus that recognized their better education and better civilian opportunities. Whether these problems would indeed occur is open for debate. Nonetheless, to address these concerns, the levels varied RMC and bonus amounts, as Table 2.5 shows.

The levels of entry pay varied from \$25,000, which was, at the time of the survey, the RMC for an E3 who enters at YOS 1, to \$30,000, which represents either a 15 percent pay raise for the E3, or the RMC of an E4 who enters at YOS 2 under the FY 2001 pay table. The bonus levels vary from \$5,000 to \$35,000. The lower value reflected the range of enlistment bonuses that were being used by some of the services to channel recruits into some hard-to-fill occupations. The upper bound of \$35,000 represented a significant increase over the \$20,000 limit established by Congress. The Army offered \$20,000 bonuses for an enlistment in a critical specialty. Given the dramatic wage gains for those with some college in the civilian labor market, the survey included a variety of pay increases, each intended to improve the competitiveness of entry RMC. While how much of a pay raise and whether all military personnel should receive the same pay raise was unclear, the survey varied the level of the pay increase to what seemed a reasonable maximum amount, 15 percent. That is, the survey gave individuals an option of entering the military as a E3 with 15 percent higher RMC than what was offered as of January 1, 2001.

Selecting the Combination of Policy Attributes

The levels of attributes shown in Tables 2.1, 2.2, 2.4, and 2.5 were combined in 36 different ways and assigned to four different versions of the survey instrument, 9 for each version. All three segments of the sample—the high school seniors, college students, and college dropouts—were asked to respond to questions about the 36 different combinations. However, dropouts were queried about their enlistment interest in 12 additional combinations, 3 combinations each, assigned across the four survey versions. Thus, the dropout sample was queried in about 48 different combinations. These additional 12 were combinations of the military attributes shown in Tables 2.4 and 2.5, and they excluded the college attributes listed in Tables 2.1 and 2.2. In other words, the additional 12 combinations were programs that would allow dropouts to enlist directly into the military without first returning to college. This subsection explains the method used to choose the 36 combinations of policy attributes and their assignment to the four instruments. Appendix C describes the selection of the 12 additional combinations for dropouts. Tables 2.6 and 2.7 list the 36 combinations, the 12 additional combinations for dropouts, and their assignment to the four survey instruments.

Given the number and levels of the attributes, there were 324 (2 college major requirements \times 2 occupational requirements \times 9 college benefit levels and years \times 9 military pay and bonus levels) combinations that could be offered. It was impractical to ask each respondent all 324 combinations, or to have 9 different programs, but 36 different versions of the instrument ($9 \times 36 = 324$). We therefore had to limit the number

of programs and versions of the instrument to a number that provided enough information to make inferences about the effect of varying an attribute on enlistment interest intensity without overloading the respondent with programs or without making the number of versions of the instrument intractable. We determined that 36 programs spread over four versions was a feasible design.

The choice of which 36 combinations to include in the survey was based on developing what is known in the statistics literature as a “D-optimal” design.³ D-optimality is the most commonly used criterion for choosing optimal designs. This criterion chooses the design matrix with the minimum variance-covariance. A design matrix has 36 rows and 4 columns where each row is a hypothetical program or “design point” and each column is a program attribute. Although we actually have five program attributes, we combined the second and third attributes, as in Table 2.2, resulting in only four attributes or columns in the design matrix. For example, a row in the design matrix might be “1 1 1 1” which would represent a hypothetical program or design point that has all four attributes set to their first level. The attributes are assumed to be categorical, meaning that ordering and magnitude do not matter. In other words, the precise encoding of the attributes is unimportant.

There are 324 possible candidate design points from which to choose the 36 that meet the D-optimality criterion. Operationally, the D-optimality criterion is defined as the determinant $\det(X'X)$ where X refers to the design matrix and “det” denotes the determinant. We choose the 36 design points that produce the minimum $\det(X'X)$. Further allocating the 36 hypothetical programs into four different blocks or versions is part of this procedure.

Finding the design that best meets the D-optimality criterion is computationally difficult because there are so many possibilities. The number of possibilities is “324 choose 36” where “choose” is a well-defined mathematical operator that means “sampling without replacement.” A number of search algorithms have been proposed to find the maximum without a complete enumeration of all possibilities. Some of the algorithms are simple and intuitive (though some amount of mathematical machinery is required to understand even the simple ones); others are much more complicated. We chose the algorithm proposed by Federov (1972) that is often regarded as the most successful (and most time consuming) of the exchange algorithms. The algorithm is also described in Mitchell (1974).

In addition to the D-optimal design we used to develop the 36 main program combinations shown in Table 2.6, we also considered fractional factorial design⁴ and cyclical designs. However, because our design has factors with very different levels (9 levels, 9 levels, and 2 levels), these alternative designs did not seem useful for our case. Moreover, as a practical matter, accommodating design changes (e.g., changing the number of levels for one of the factors) is much easier with a D-optimal design than with a factorial design.

The development of the 12 additional programs shown in Table 2.7 for dropouts was somewhat more complicated and is described in Appendix C.

Other Survey Sections

The policy programs discussed above are presented in the third section of the survey instrument, after the screening section and the section regarding future career and educational plans. In addition to these questions, the survey also queries respondents about their planned methods of paying for college, their employment status, and their background information. These other sections provide information that allows us to control for

³ Voss (1999) describes design methods when the program attributes differ in their number of levels.

⁴ As discussed in Chapter One, the marketing literature uses the term *conjoint analysis* instead of factorial experiments. The latter term is used in the statistics literature. Conjoint analysis is often the same thing as factorial experiments, although the term *conjoint analysis* is often used quite broadly and so also can refer to methods related but not part of the factorial experiment literature.

Table 2.6
Hypothetical Programs Included in Survey Instrument

Program Number	Instrument Version	Military Occupational Requirement	College Major Requirement	Entry Pay and Bonus Amount	College Benefit ^a
1	1	Yes	Yes	\$25K + \$5K Bonus	\$600/mo, two years
2	1	No	Yes	\$26K + No Bonus	\$900/mo, four years
3	1	No	No	\$25K + \$15K Bonus	\$1400/mo, two years
4	1	No	No	\$25K + \$35K Bonus	\$65K LRP + \$150/mo, two years
5	1	Yes	No	\$25K + \$25K Bonus	\$900/mo, two years
6	1	Yes	Yes	\$29K + No Bonus	\$600/mo, four years
7	1	Yes	No	\$28K + No Bonus	\$1200/mo, two years
8	1	Yes	Yes	\$30K + No Bonus	\$1400/mo, four years
9	1	No	Yes	\$25K + No Bonus	\$1200/mo, four years
10	2	No	Yes	\$25K + \$25K Bonus	\$600/mo, four years
11	2	Yes	No	\$25K + \$5K Bonus	\$1400/mo, two years
12	2	No	Yes	\$29K + No Bonus	\$1400/mo, four years
13	2	Yes	Yes	\$26K + No Bonus	\$1200/mo, two years
14	2	Yes	No	\$25K + No Bonus	\$900/mo, four years
15	2	Yes	No	\$25K + \$15K Bonus	\$65K LRP + \$150/mo, two years
16	2	No	No	\$28K + No Bonus	\$1200/mo, four years
17	2	No	Yes	\$25K + \$35K Bonus	\$900/mo, two years
18	2	No	Yes	\$30K + No Bonus	\$600/mo, two years
19	3	No	Yes	\$25K + \$25K Bonus	\$1200/mo, two years
20	3	No	Yes	\$25K + \$15K Bonus	\$900/mo, four years
21	3	Yes	Yes	\$25K + \$35K Bonus	\$1200/mo, four years
22	3	Yes	Yes	\$28K + No Bonus	\$1400/mo, two years
23	3	Yes	No	\$25K + No Bonus	\$1400/mo, four years
24	3	No	No	\$29K + No Bonus	\$600/mo, two years
25	3	Yes	No	\$26K + No Bonus	\$900/mo, two years
26	3	No	No	\$25K + \$5K Bonus	\$600/mo, four years
27	3	Yes	Yes	\$30K + No Bonus	\$65K LRP + \$150/mo, two years
28	4	Yes	Yes	\$25K + \$15K Bonus	\$600/mo, two years
29	4	Yes	No	\$25K + \$35K Bonus	\$600/mo, four years
30	4	No	Yes	\$25K + \$5K Bonus	\$900/mo, two years
31	4	No	Yes	\$25K + No Bonus	\$1400/mo, two years
32	4	No	No	\$30K + No Bonus	\$1200/mo, two years
33	4	Yes	No	\$29K + No Bonus	\$1400/mo, four years
34	4	No	No	\$26K + No Bonus	\$1400/mo, four years
35	4	Yes	No	\$25K + \$25K Bonus	\$900/mo, four years
36	4	No	Yes	\$28K + No Bonus	\$65K LRP + \$150/mo, two years

^aLRP is the loan repayment program

factors affecting enlistment interest other than the hypothetical policies. As described in Chapter Four, these factors are included as control variables in the regression analysis. The discussion below briefly summarizes the questions in these other sections.

The survey begins with three questions that determine eligibility to participate in the survey. The first question ensures that individuals are between the ages of 17 and 21, the prime recruiting age. The second

Table 2.7
Additional Hypothetical Programs for College Dropouts

Program Number	Instrument Version	Military Occupational Requirement	Entry Pay and Bonus Amount
1	1	Yes	\$28K + No Bonus
2	1	No	\$25K + No Bonus
3	1	Yes	\$25K + No Bonus
4	2	No	\$25K + \$5K Bonus
5	2	Yes	\$25K + \$5K Bonus
6	2	No	\$30K + No Bonus
7	3	No	\$25K + \$35K Bonus
8	3	Yes	\$25K + \$35K Bonus
9	3	Yes	\$30K + No Bonus
10	4	Yes	\$25K + \$30K Bonus
11	4	No	\$25K + \$25K Bonus
12	4	No	\$29K + No Bonus

ensures that individuals are in the college market (i.e., they are either high school seniors with plans to attend college within a few months of graduation, a current college student, or a recent dropout from college). The third question ensures that individuals have not already chosen to enter either an active or reserve component of the military (i.e., they are not in the Delayed Entry Pool (DEP) and they are not enrolled in college or junior ROTC). We chose to exclude the individuals who already chose the military because we wanted to focus on the effect of alternative policy options on the enlistment intentions of those who currently have not taken any steps toward enlistment.

The second section queries survey participants about their future career and educational plans. The section also asks about how likely it is that they would be serving in the military in the next few years. This question was modeled after the questions included in the Defense Manpower Data Center's Youth Attitude Tracking Study (YATS). The survey also asks respondents about the main reasons for considering or for rejecting the military as a career choice. These questions were also modeled after those included in YATS.

The third section presents the policy programs described above. In addition to the programs, this section includes a set of questions specifically designed for the college dropouts. The survey asks them about their main reasons for leaving college before completing a degree, when they left college, and the actions they took to plan their next step after dropping out of college. Such actions could include discussing alternative plans with family members and counselors, searching for a job in the newspaper or on the World Wide Web, or contacting an employer about a job.

The next two sections of the survey query participants about anticipated college expenses and their employment status. The college expense section includes living expenses and how respondents plan to cover these expenses. For example, the survey asks whether they expect financial aid, the type of aid expected (loan or grant, state or federal, etc.), and how much aid they might get. The employment section asks about employment status and their earnings from all jobs.

The final section of the survey asks individuals about their background, including their demographic characteristics, their current grade in school, their GPA, the number of their completed college semester or quarter credits, their family income, whether one of their parents has served in the military, and the highest grade or year of school that their mother had completed. The last variable is often correlated with the decision to enlist rather than attend college or work full-time (Hosek and Peterson, 1985; Kilburn and Klerman, 1999).

Survey Instrument Pretest

To help ensure that our survey instrument was clearly written, effective in soliciting the information we needed, and not so long as to reduce the completion rate, we conducted three pretests of our survey instrument in the Fall of 2000. As part of the pretest sessions, we also held structured discussions with the pretest participants to solicit input about specific methodological issues relating to how we planned to conduct the survey (discussed in more detail in Chapter Three). The three pretest sessions consisted of groups of young adults, ages 17 to 21, who were in each of the three college market segments. A separate session was conducted with individuals from each group. Thus, the first group consisted of only college-bound high school seniors, the second consisted of current college students, and the final group consisted of recent college dropouts. There were nine participants in each pretest group. The specific questions and issues we wanted to address included:

- Were all of the questions clearly written?
- Did any response categories seem to be missing on some questions?
- Did the hypothetical policy options make sense?
- Were the programs attractive?
- Would responses to the hypothetical policy scenarios vary sufficiently to allow us to estimate a policy effect of an attribute on enlistment interest within our target level of precision?
- Did most of the college students and dropouts live at home with their parents or guardians or on their own? If the latter, reaching them would be more difficult.
- Would their parents forward mail to them if they did not live at home?
- How likely is it that they would fill out the survey?
- How would they prefer to fill out the survey: electronically, by phone, or by mail?
- How long did it take to fill out the survey?
- Would individuals be more likely to respond if they were given a small monetary incentive, such as \$1?

The format for each session and the questions asked as part of the structured discussion are provided in Appendix D. Although the purpose of the pretest was to get specific information on how to improve our survey instrument and methodology, the structured discussions also provided some interesting insights into how individuals in the college market view their career opportunities and the military specifically. Much of this information was revealed in the survey responses and is discussed in some detail in Chapters Five and Six of this report. Nonetheless, for completeness and additional anecdotes, we provided some of the comments and information we learned as part of the group discussions in Appendix D. The appendix also discusses how we recruited the three groups and some of the information we learned that helped us improve the survey instrument and methodology.

Survey Design and Design Assessment

This chapter summarizes how the survey was designed in terms of the population we chose, the methods we used to reach the sample and improve our response rates, and the determination of the sample sizes and target response rates. We also discuss our success in reaching the sample and our actual response rates.

The Population From Which Our Sample Was Drawn

The survey was conducted in the winter of 2001. The targets of our survey were individuals ages 17 to 21 who were college-bound high school seniors, current college students, and recent college dropouts. We investigated several alternative methods of identifying these groups, choosing a random sample from each one, and contacting them. One method we considered was to obtain high school and college school lists. In the case of dropouts we considered the possibility of matching college lists from year to year to identify those who left a given school. This method was ruled out for several reasons. First, the cost of the survey would increase to the extent that we could not identify which high school students on any given school list were college bound. Furthermore, we learned that some colleges do not have the resources to keep up-to-date electronic files of their student body. Thus, students who drop out are not always culled from the records. Finally, students who leave a given school may not be dropouts, but simply transfers to other schools.

Another method we considered was to obtain lists of individuals 17 to 21 from lists maintained by private credit card companies. These companies assemble lists from various sources including high school lists and lists of individuals who buy class rings or order class photographs. Based on conversations with credit card company representatives we determined this method was also infeasible because we could not guarantee that we had a full list from which to draw a random sample and the cost of obtaining the lists was prohibitive given our budget.

To reach our sample, we used current and a two-year-old list of high school students who were identified as college bound. Since the survey was conducted in winter 2001, the lists were for the high school classes of 2001 and 1999. A commercial vendor, American Student List (ASL) compiled the lists. ASL purchases these lists from various sources including schools, and they include name, address, phone number, and gender. ASL claims that the lists are updated quarterly. As discussed later in this chapter, the relatively high fraction of respondents who were eligible for our survey suggests that the ASL lists were quite accurate. The addresses are those of the individuals' parents or guardians, given that the lists cover students still in high school. The vendor identifies which of the students on the list are or were college bound based on administering a survey

of individuals on the list, estimating what characteristics are associated with being college bound, and applying the estimates to their list.

The respondent universe for the survey was the college market that, for our purposes, consisted of three groups: (1) high school seniors in the class of 2001 who were college bound; (2) former college-bound high school seniors (from the high school graduation class of 1999) who were college students in the winter of 2001; and (3) former college-bound high school seniors (from the high school graduation class of 1999) who were recently disenrolled from college in the winter of 2001.

The sample of college-bound high school seniors was randomly drawn¹ from the 2001 ASL list. The sample of college students and recent dropouts was randomly drawn from the 1999 ASL list of college-bound high school seniors. Consequently, we had two samples. As discussed in Chapter Two, we included a set of screener questions in the survey instruments to determine to which group individuals belong.

Survey Implementation Methodology

The fielding of the survey allowed multiple response modes that included the opportunity for participants to respond electronically through the World Wide Web or by mail with paper and pencil. The survey also involved extensive contact and follow-up. Each individual selected to participate in the survey heard from us, either through mail or by phone, several times before we gave up and concluded they were a nonrespondent. Table 3.1 summarizes the timeline of the implementation of the survey and ways we attempted to contact and follow-up with each survey list member. Initially, participants were only given the opportunity to respond electronically. At the start of the survey effort, individuals in the sample were mailed a prenotification letter that described the purpose of the survey and what the survey required. The letter provided the Web site address and password to ensure confidentiality of responses. Reminder phone calls were made shortly thereafter, although only to about 20 percent of the sample (randomly selected) to reduce the cost of the survey effort. A reminder letter was then sent to nonrespondents and a thank-you note was sent to the respondents.

Table 3.1
Timeline for Web and Mail Surveys

Description	Day
Initial letter to 3,000 students (phone reminder group)	0
Letter to parents (phone reminder group)	7
Initial letter to 11,250 students (non-phone reminder group)	14
Letter to parents (non-phone reminder group)	14
Phone reminder (phone reminder group)	14–28
Letter reminder	21
Letter with 1st hard copy (non-incentive group)	36
Letter with 1st hard copy + \$3 incentive (incentive group)	41
Reminder post card (non-incentive group)	46
Reminder post card (incentive group)	49
2nd hard copy	67
End of survey	90

¹ More precisely, we sampled every n th observation in the list. This is known as systematic sampling (see Cochran, 1977). If the order of names on the lists we used is random, then systematic sampling is equivalent to random sampling, on average.

Following the reminder letter, another letter was sent to nonrespondents. This letter kicked off the paper-and-pencil part of the survey as the letter also included a hard copy of the survey instrument in addition to the Web site address and password. Furthermore, a small incentive to participate in the survey was enclosed in the first mailing of the hard copy survey to about half of the nonrespondents. Selection for the incentive was random among the nonrespondents at the time of selection. Those selected in the 2001 high school sample were given a \$3 gift certificate to McDonald's fast-food restaurant. Those selected in the former high school senior sample (i.e., the 1999 high school sample) were given a \$3 gift certificate to Starbucks coffee stores. A reminder post card was then sent to the nonrespondents who had been sent the hard copy of the survey. A replacement hard copy questionnaire was then sent to the nonrespondents. The survey ended with a thank-you note to the final set of participants.

The survey method varied slightly between the current college-bound high school seniors (the class of 2001) and the former seniors (the class of 1999). Because some of the current seniors were legal minors, a parental consent letter was sent before the prenotification letter. The consent letter provided an 800 number that parents or guardians could call as well as a postage-paid post card for parents to send back if they did not want their child to participate in the survey. We also sent a reminder card to the parents regarding parental consent.

For the former seniors, our survey method needed to recognize that some of these individuals no longer live at home with their parents and guardians. The initial letter to the respondent and the reminder/thank-you letter had a "please forward" statement written on the envelope. Phone calls were made to the parent's house, but we requested to speak with the respondent. If the respondent no longer lived with his or her parent, we asked parents to forward the letter to the respondent, and we asked for the respondent's address. In addition, we sent a letter directly to the parents at the start of the survey. This parent letter described the survey's purpose, what we were asking their son or daughter to do, and it requested the parents' support for our study effort, including forwarding letters and surveys to their children, if they no longer lived at home.

The graphic layout of the survey in both the Web-based version and hard copy version was developed using input from past research. Jenkins and Dillman (1993) review the literature on the language and layout of self-administered surveys and recommend presenting information in a format that respondents are accustomed to reading, putting instructions at the places where they are needed, incorporating design features for skip instructions that enhance understandability, and so forth. To further improve the clarity of the Web-based version of the survey, we conducted a small pretest of the Web-based survey in the winter of 2001 using RAND colleagues who volunteered to take the survey and provide comments on the format and question clarity. We had nine volunteers who provided extensive comments that were incorporated in the final version of the Web-based survey.

Determination of the Sample Sizes and Target Response Rates

We computed the target sample sizes in two steps. In the first step we determined that we needed 503 eligible, completed responses from each of the high school student, college student, and dropout groups in order to have sufficient statistical power. In the second step we inflated the required number of eligible, completed responses to account for anticipated noncontact, nonresponse, and ineligibility. The target sample size for the high school seniors was computed to be 1,745; the target sample size for the group containing both the college students and dropouts was computed to be 12,412. In the following discussion, we explain these two steps in more detail.

In the first step, we estimated the required sample sizes of eligible and complete responses. To compute sample sizes, we considered a regression model of enlistment interest level (on a scale of 1 to 7) as a linear func-

tion of the five policy attributes. Two-way interactions were added to the linear regression model. (While the linear regression model is not ideally suited for the analysis, it can still be used for survey design and sample size computation purposes.) We assumed that the parameter estimates of the effects of the policy attributes on enlistment level are normally distributed. We then needed to specify the significance level α , the required power, the minimal detectable policy effect, and the standard error of each policy attribute variable. The minimum policy effect refers to the minimum change in the enlistment level that our sample size computations are designed to detect. The sample size calculations assume a minimum policy effect of 1, on the 7-point scale. That is, the survey is designed so that the estimated effects of policy attributes on enlistment interest would be statistically significant at the 5 percent if the effect size exceeds 1.²

For α and the required power, we used standard assumptions and set them to 0.05 and 0.8, respectively. To compute the standard error of each policy attribute variable, we used simulation. The general approach to using a simulation for this purpose is described in Appendix E. The simulation consists of drawing at random the 7-level propensity level variable, with each level having equal probability. The assumption of a uniform distribution across the levels is conservative.

These power calculations yield a sample size of 251.5 completed questionnaires. However, asking one respondent nine questions is not the same as asking nine respondents one question each. The answers of a single respondent are likely to be less variable than the answers of nine respondents. In statistics this concept is captured through a quantity known as the cluster effect. We assumed a cluster effect of 2, meaning that we believe that asking one respondent nine questions is no worse than asking four-and-a-half respondents one question each. The assumption of a cluster effect of 2 is conservative. It doubles the sample size. As discussed in Chapter Five, we also account for the cluster effect in our estimation strategy by adjusting the standard errors of the estimates to account for the possibility of a correlation in the error term across observations in our data. Overall, the calculations yield a sample size of 503 for each group of high school students, college students, and dropouts.

In the second step, we inflated the required number of eligible, completed responses to account for non-contact, nonresponse, and ineligibility. These assumptions are summarized in Table 3.2. College students and dropouts come from the same list of former high school students (class of 1999). Because about 25 percent of the college students leave their school after the first year (ACT News Releases, February 16, 2000, and November 15, 2002), the required number of eligible, completed responses for the class of 1999 was 2,011, or (roughly) 503 multiplied by four.

Table 3.2
Assumptions Made for the High School and College-Bound Lists

Survey	High School	College
Number of completed surveys	503	2,011 ^a
Contact rate	0.80	0.60
Screening pass rate	0.80	0.60
Response rate	0.45	0.45
Sample size	1,745	12,412

^aBased on the fact that about 25 percent (i.e., 503) college students drop out after their first year.

² Smaller effects can be detected, albeit with less power.

We made different assumptions for the high school group (class of 2001) and the college dropout group (class of 1999) because in the latter group we had to rely on the cooperation of parents in the cases where youth no longer lived at home. Consequently, they were much harder to reach.

The assumed screening pass rate accounted for the possibility that the sample included youth who would be ineligible to participate in the survey. In other words, they may fail (despite the information provided to us by ASL) to be a college-bound high school student, a college student, or a dropout, and they might not be in the 17 to 21 age group. The target response rates assumed in Table 3.2 account for our efforts to improve the number of responses through the use of reminder phone calls, letters, post cards, and a small incentive. The contact rate accounts for the possibility that some of the ASL addresses were incorrect or that the parents would fail to forward the letter to their children. To help improve our contact rate, we verified the addresses and phone numbers of the youth in the sample through post office change of address services.

For the high school student group, the computations yield a target sample size of 1,745. (This number can be obtained by multiplying $1,745 \times 0.8 \times 0.8 \times 0.45 = 503$, in Table 3.2.) This figure corresponds to an anticipated response rate of 23.8 percent ($0.8 \times 0.8 \times 0.45$). The universe size for the current high school class of seniors (i.e., the class of 2001) is about 3 million nationwide.

For the college/dropout group, the computations yield a target sample size of 12,412. This figure corresponds to an anticipated response rate of 16.2 percent ($0.6 \times 0.6 \times 0.45$). The universe size for the former high school class of seniors (i.e., the class of 1999) is also about 3 million. The size of the target sample is substantially larger for this group because we estimated that only about 25 percent of the completed responses would be dropouts. To ensure a sufficiently large subsample of dropouts, we required an even larger sample from the 1999 high school class list. Furthermore, we anticipated that the contact rate would be substantially lower because we had to rely on the cooperation of parents in the cases where youth no longer lived with their parents. Since some parents were likely to have a negative view of the military or of surveys in general, even independent of their children's views, we needed to account for the possibility that we would not gain their cooperation.

Assessment of the Survey Design Assumptions

The survey was designed to yield 503 eligible responses from the college-bound high school student sample and 2,011 eligible responses from the college student sample, including 503 college dropouts. We obtained 352 eligible responses from the high school sample and 2,228 eligible responses from the college sample, including 211 dropouts. These figures correspond to response rates of 22.7 percent³ for the high school student sample and 20.5 percent for the college student/dropout sample. These and other statistics are summarized in Table 3.3. Because there were far more college students than high school students, the overall response rate was 20.8 percent (not shown). In Table 3.3 we distinguish between the RR4 response rate (see Footnote 3) and the return rates. The return rate is defined as the number of returned responses divided by the number of mailings. Table 3.3 compares the assumptions we made when we designed the survey, described above, and what we achieved after fielding the survey.

When we designed the survey, we had assumed that the fraction of eligible responses (respondents who passed the screening questions) would be 80 percent for the high school student sample and 60 percent for the college student and dropout (class of 1999) sample. We achieved better than these rates. The fraction of eligible

³ Response rates (RR) refer to the RR4 definition (American Association for Public Opinion Research, 2000). RR4 includes incomplete responses and uses the number of estimated eligible nonrespondents rather than the total number of nonrespondents. We estimated that 86.5 percent of the nonrespondents would have been eligible for the survey. This figure corresponds to the fraction of World Wide Web respondents that pass the screening test.

Table 3.3
Comparison of Design Assumptions and Survey Results

	Design Assumptions		Survey Results	
	High School	College (Including Dropouts)	High School	College (Including Dropouts)
Number of surveys	503	2,011	352	2,228
Screening pass rate	80.0 percent	60.0 percent	91.0 percent	85.8 percent
Combined contact and response rate	36.0 percent	27.0 percent	22.2 percent	18.9 percent
Return rate	28.8 percent	16.2 percent	20.2 percent	16.3 percent
RR4 response rate	N/A	N/A	22.7 percent	20.5 percent

Note: The return rate refers to the number of returned responses divided by the number of mailings and equals the product of the screening pass rate, contact rate, and response rate. The response rate RR4 also accounts for the number of estimated eligible mailings and is not easy to compare with the design assumptions.

responses turned out to be 91.0 percent for the high school student sample and 85.8 percent for the college student/dropout sample.⁴ Thus, we were more efficient than expected in reaching our target college market sample. Since ineligible students are presumed to be less likely to return questionnaires, it is not possible to estimate the true fraction of ineligibles in our sample. We can only compute the fraction of eligible individuals among those who responded.

We also cannot assess the contact rate and the response rate separately because we cannot know why someone did not respond. Therefore, we combined these two categories in Table 3.3. However, we can assess the screening pass rate separately by response channel: mail or World Wide Web. The screening pass rate of mail responses was 99.3 percent. This figure reflects the fact that ineligible mail respondents do not return the survey. The numbers reported in Table 3.3 are therefore only based on the Web response rate. The high rates of eligibility, 91 percent and 85.8 percent, suggest that the ASL lists of college-bound high school seniors are quite accurate.

We achieved a return rate of 20.2 percent for the high school senior group (class of 2000) and a rate of 16.3 percent for the college student and dropout group (class of 1999). The rate for the latter group met our expectation of 16.2 percent but the rate for the former group fell short of our expectation of 28.8 percent.

We had assumed that 25 percent of the college sample (class of 1999) were dropouts. The actual fraction of dropouts among the returned questionnaires was substantially lower, 10.0 percent. This lower figure may stem from either a lower response rate among dropouts or from an incorrect assumption about the population fraction, or both. Unfortunately, it is not possible to estimate these two quantities individually from this survey.

To address possible biases from nonresponse, we created and used post-stratification weights in descriptive analysis, as discussed in the next subsection, and controlled for various background characteristics in our regression analysis. That we find elasticity estimates in Chapter Six that correspond in terms of relative size with estimates commonly found in the literature on enlisted supply suggests that the survey is providing sensible results. Finally, our conclusions focus on the relative effects of different policy attributes, rather than on the absolute magnitudes of the effects.

In the process of conducting our survey, we learned about the relative effectiveness of Web versus mail survey methods, the effectiveness of phone call reminders, and the effectiveness of incentives. The lessons we

⁴ These percentages are based on World Wide Web respondents only. As we explain later, the fraction of eligible individuals who responded by mail is close to 100 percent and not useful.

learned are summarized in Appendix F and in our paper on Web surveys as part of a mix-mode survey strategy (Schonlau, Asch, Du, 2003).

Assessing Representativeness

Ideally we would like to know how representative our sample is. One indication that the sample is representative is that the distributions of characteristics of the sample match those of the underlying population. Our underlying population consists of dropouts, college-bound high school students, and college students. The first two populations are relatively unusual and we have no data that would allow us to determine the characteristics of the different populations. Identifying college dropouts is particularly difficult and had we known of a data set that provided information on the population of college students, dropouts, and college-bound high school seniors, we probably would have used that data as our source for drawing the survey sample. As discussed earlier, we ended up relying on older lists of high school students. Nonetheless, information is available for one of our populations, namely, college students. A significant amount of information is gathered by the Department of Education on college enrollment and enrollee characteristics.

We can get a rough sense of how well our sample represents the underlying population by comparing some of the characteristics of our sample with that of the entire college enrollee population, provided by the Department of Education and reported in the *Statistical Abstract of the United States, 2000* (U.S. Bureau of the Census, 2000). According to Department of Education figures, 44.9 percent of college enrollees, ages 18 to 21, are male (U.S. Bureau of the Census, 2000, Table 296, p. 182). Our sample of college students is 35.7 percent male. Therefore, our sample has an overrepresentation of females compared to the general population. The Department of Education also reports that among all college enrollees (not just those between the ages of 18 and 21) 61.1 percent are enrolled in four-year institutions (U.S. Bureau of the Census, 2000, Table 297, p. 183). Our sample of college students has 70.9 percent enrolled in a four-year college or university. Thus, our sample has an overrepresentation of students in four-year colleges. Our sample also has an overrepresentation of whites and an underrepresentation of blacks. The general population of college enrollees is 70.8 percent white and 10.7 percent black while our sample of college students is 77.7 percent white and 5.7 percent black.

These figures indicate that our college student sample is somewhat more likely to be white, female, and enrolled in a four-year college or university than is the general college enrollment population. Thus, there is possibly some question of the relevancy of our results for the entire population. On the other hand, the results pertaining to enlistment propensity and reasons for joining the military, shown in Tables 5.1 and 5.2 and discussed below, are consistent with other studies of enlistment propensity and reasons for joining the military. Still, to improve the representation of our results, we created post-stratification weights, as described in the next subsection. These weights were used to compute the descriptive statistics shown in the next chapter. Furthermore, our regression analysis controls for gender, institution type (two-year, four-year, or vocational), race, ethnicity, and a number of other background characteristics. Our simulations of the effects of different policy attributes on enlistment interest are also weighted. Finally, our analysis of the effects of the different policies compares the relative appeal of the hypothetical alternatives rather than enlistment interest levels per se. One would have to argue that not only were the nonrespondents significantly different from the respondents but that the two groups differed specifically in the relative appeal of the hypothetical alternatives. There is no reason to suppose that this is the case. While it is possible that our analysis still suffers from a lack of representation on some dimension that we cannot observe, from a practical standpoint, the issue of representativeness is less of a concern given the weighting we perform and given our focus on the relative rather than the absolute level of appeal of the hypothetical programs in our survey.

Post-Stratification Weights

Post-stratification weights (Zhang, 2000) can be constructed to correct for possible bias resulting from non-response. When certain key demographic variables are known for a population (e.g., from a census or other reliable source) sometimes post-stratification is applied to the survey data. Post-stratification forces the survey data to match a known distribution of the demographic variables. This is accomplished by creating or modifying survey weights. In our case the weights were based on three variables: gender, ethnicity, and education level. These variables are commonly used for the creation of post-stratification weights. For our purposes, gender has two levels (male, female), ethnicity has four levels (white, black/African American, American Indian, Asian), and education has three levels (high school seniors, dropouts, and college students). The weights were constructed to match the joint distribution of all three variables based on the 1999 Current Population Survey (CPS) data. A joint distribution is a distribution that considers all variables simultaneously rather than one at a time (the so-called marginal distributions). For example, specifying the joint distribution with two categories for gender, three categories for education status, and four categories for ethnicities requires the specification of $2 \times 4 \times 3 = 24$ cells that together make up the joint distribution. Specifying the marginal distributions (one distribution at a time) would require the specification of only $2 + 4 + 3 = 9$ cells. Before constructing the weights, we limited the CPS sample to individuals who are between ages 17 and 21, consistent with our survey age criterion.⁵

The education status variable was derived from two CPS variables: The first variable, school level, indicates whether a student is currently enrolled in high school, college, or not currently enrolled. The second CPS variable, graduation, gives the highest education level achieved. Categories of this variable include "grade 11," "grade 12," "high school graduate," and "some college". For the purpose of constructing the weights we defined dropouts as students that were currently not enrolled and who had some college. We defined high school students as students who were currently enrolled in high school and had completed grade 11 or higher. We defined college students as students who were currently enrolled in college and had completed at least grade 11 but who did not yet have a degree.

⁵ There were cases where two of the cells had low counts, resulting in the computation of large post-stratification weights. In those cases, we trimmed the weights to 5, meaning that we reduced those weights to a value of 5. Trimming the weights reduces the sum of all weights. As a result we had to inflate the trimmed weights to ensure that the sample size remained the same. The process of inflating the weights to control their sum is called restandardization. Trimming large weights is standard practice. Only six respondents were affected by the trimming.

Modeling Recruiting Policy Effects on Youth Enlistment Interest

The purpose of the survey was to obtain data to estimate the relationship between the policy attributes and the level of enlistment interest in programs that involve college before accession or entry into the military. These estimated relationships provide information on which attributes are likely to have the largest effect on enlistment and provide input for the computation of the cost-effectiveness of alternative attributes. Because the policy effects are estimated relative to a baseline college-before-accession program, the estimated relationships provide information on how to improve programs that involve college first, and not how college-first programs compare relative to programs that do not provide the opportunity to attend college before accession.¹

This chapter describes the methodology used to estimate the relationship between the policy attributes and enlistment interest level. First we present a brief conceptual framework of the link between recruiting policies, enlistment interest, and enlisted supply to place the empirical work within a broader context.

Conceptual Framework

The enlistment process can be viewed as the means by which potential enlistment supply is converted into actual enlistments into the military.² Enlistment propensity, defined as the proportion of youth indicating that they have a positive interest in joining the military in the future, is a summary measure of potential enlistment supply. Given our 7-point scale for measuring youth interest in the various hypothetical programs offered in the survey, positive propensity is the proportion of respondents indicating a level of 5 and above, where 7 is the highest level. Enlistment propensity captures the effects of various factors on youth's interest in joining the military. These factors include the benefits the military offers, outside opportunities relative to those in the military, recruiting resources such as military recruiters and advertising, and societal attitudes toward the military.

Since the hypothetical college-before-accession programs included in the survey increase the benefits associated with serving in the military, our analysis posits that these programs will generally increase enlistment interest, thereby increasing the proportion of respondents expressing a positive propensity to enlist.

¹ Other research such as Orvis (2001) and Golfin (1998) provide information on the effects of college-before-accession programs on enlistments relative to current enlist-before-college programs.

² This conceptual framework is drawn from Asch and Orvis (1994). The propensity measure used in this paper is based on analysis of the YATS. The YATS includes a 4-point scale to measure propensity to enlist. Although the responses to the 4-point scale in YATS are not directly comparable to the responses to the 7-point scale in our survey (see Rockwood, Sangster, and Dillman, 1997), the conceptual framework is similar for understanding the conversion of potential supply into actual supply.

The effects on enlistment interest of the different attributes of these programs may differ, however. Typically, bonuses are estimated to have a smaller effect on enlistment supply than either pay increases or educational benefits (such as the College Fund and the MGIB). Because relatively little evidence exists on the effects of policies involving college-before-accession program on enlistment and indeed a purpose of the survey was to provide information on such effects, we do not know a priori how the different factors will affect interest levels. One factor that may be important is the timing of the receipt of different benefits. For example, tuition stipend benefits are paid while the individual attends college. In contrast, loan repayment benefits are paid later, only after the individual has attended college and has incurred college debt. Similarly, within the context of college-before-accession policies, military pay and bonuses are only paid after the individual has attended college and entered the military. If youth discount heavily benefits that are only received in the future, it would seem that they might place a lower value on pay, bonuses, and loan repayment relative to tuition stipends. On the other hand, increases in military pay over time improve entry pay as well as service members' pay in future years. Furthermore, the loan repayment benefit is quite high, equal to \$65,000, which could compensate for the fact that they are not received until some time in the future. An important part of our analysis is estimating and comparing the different effects of stipends, loan repayment, bonuses, and pay on enlistment propensity for college-before-accession programs among the sample respondents.

The different groups of respondents—high school students, college students, and dropouts—may value the attributes of the college-before-accession program differently. The survey told respondents that if they did not meet the requirements for the benefit, such as maintaining a C GPA while attending college and completing at least two years of college, they would have to repay the stipend benefit and entry bonus if one is received. The groups may evaluate differently the risks of not meeting these requirements. For example, college dropouts who return to college under this program may assign a higher probability to dropping out (again) in the future than would a current college student because the dropout has already demonstrated a propensity to leave college without a degree.

It is also important to note that dropouts may respond to the hypothetical program attributes differently, depending on whether or not the hypothetical program allows them to return to college before serving in the military. For example, higher entry pay is likely to be worth more to those dropouts who are offered the opportunity to directly enter the military without returning to college because they can immediately receive the higher pay, rather than wait until they complete the college part of the program. On the other hand, a program that offers both higher pay and a monthly college stipend has a higher dollar value (and cost) and may be worth more even to a dropout who does not have a strong preference to return to college. How dropouts evaluate these different benefits is one of the purposes of the survey.

As mentioned in Chapter One past analyses demonstrate that there is a strong relationship between enlistment propensity and the likelihood of enlistment. In fact we use these past estimates of the relationship between propensity and enlistment to compute marginal cost estimates of different hypothetical programs. These cost estimates and the past estimates between propensity and enlistment are discussed in Chapter Seven.

Empirical Methods

The method we use is regression analysis. We estimate a regression of the relationship of the level of stated enlistment interest or propensity level and the five policy attributes. As described in Chapter Three, the five policy attributes are: (1) the level college stipend or loan repayment; (2) the number of years (two or four) for which the benefit would be paid; (3) the requirement to major in a vocational area rather than any area; (4) the level of military pay and, in some cases, enlistment bonus; and (5) the requirement to enter a technical military

career field at entry (rather than any career field). To control for other factors that may affect enlistment interest, we also include other variables in the regression equation such as demographic characteristics and work characteristics. These variables were drawn from the various sections of the survey instrument.

We included variables in the model to capture various interactions. We included the interactions of the five policy attributes with variables that indicate the individual's college segment group (high school student, college student, or college dropout). We also included variables representing the interactions between the programs themselves. These latter variables capture whether any given policy attribute has a large effect on enlistment interest level when it is combined with another policy attribute. Another set of interaction variables that we included was between gender and policy attributes and between ethnicity groups and policy attributes. Finally, because it is of interest to determine whether the college-before-accession policy attributes are more effective for dropouts than the ones that allow direct enlistment (without returning to college), we included variables in the regression that represent the interaction of the policy attributes, the program type (a college-before-accession program or a program that allows direct enlistment), and dropout status.

Except for the interactions of the policy attributes with gender, few of the estimated effects of these interactions were statistically different from zero. To conserve on degrees of freedom in our analysis, we redid the analysis only including the interactions of the policy attributes with gender and the few statistically significant interactions between policy attributes and groups among the list of covariates.

More specifically, the regression equation can be expressed as:

$$E_{ij}^* = \gamma Z_{ij} + \beta X_{ij} + \varepsilon_{ij}$$

where E_{ij}^* is the individual i 's interest in enlistment for program j , Z_{ij} is the vector of variables representing the five policy attributes and their interactions with gender, γ is the vector of parameters that represents the effect of the policy attributes on enlistment interest, X_{ij} is the vector of demographic variables, β is the vector of parameters representing the effect of those variables on enlistment interest, and ε_{ij} is a random error term that we assume has a logistic distribution. Unfortunately, we do not observe actual enlistment interest, E_{ij}^* . We only observe the stated level of interest on a 7-point scale that was arbitrarily chosen. That is, we could have chosen a 5-point scale or even a 10-point scale. The level of interest indicated by the respondent is dependent on our choice of scale. Following the literature that addresses this type of situation, we model the response level as multinomial ordered choice known as the ordered logit model (Greene, 1993, pp. 672–674).

In the model, E_{ij}^* is assumed to be a latent variable that is not observed. What we do observe is the ranking on a scale of 1 to 7 of E_{ij} where:

$$\begin{aligned} E_{ij} &= 1 \text{ if } E_{ij}^* = \gamma Z_{ij} + \beta X_{ij} + \varepsilon_{ij} < \mu_1 \\ E_{ij} &= 2 \text{ if } \mu_1 < E_{ij}^* = \gamma Z_{ij} + \beta X_{ij} + \varepsilon_{ij} < \mu_2 \\ E_{ij} &= 3 \text{ if } \mu_2 < E_{ij}^* = \gamma Z_{ij} + \beta X_{ij} + \varepsilon_{ij} < \mu_3 \\ E_{ij} &= 4 \text{ if } \mu_3 < E_{ij}^* = \gamma Z_{ij} + \beta X_{ij} + \varepsilon_{ij} < \mu_4 \\ E_{ij} &= 5 \text{ if } \mu_4 < E_{ij}^* = \gamma Z_{ij} + \beta X_{ij} + \varepsilon_{ij} < \mu_5 \\ E_{ij} &= 6 \text{ if } \mu_5 < E_{ij}^* = \gamma Z_{ij} + \beta X_{ij} + \varepsilon_{ij} < \mu_6 \\ E_{ij} &= 7 \text{ if } \mu_6 < E_{ij}^* = \gamma Z_{ij} + \beta X_{ij} + \varepsilon_{ij} \end{aligned}$$

The variables μ_1, \dots, μ_6 are considered ancillary parameters that are estimated along with the vectors γ and β . For ease of notation, we let $S_{ij} = \gamma Z_{ij} + \beta X_{ij}$, so that $E_{ij}^* = S_{ij} + \varepsilon_{ij}$. Given that the values of ε_{ij} are logistically distributed across the observations, the logistic cumulative distribution function is given by $\Delta(S_{ij}) = 1/[1 + \exp(-S_{ij})]$. Therefore, we get the following probabilities, denoted Prob:

$$\begin{aligned}
\text{Prob}(E_{ij} = 1) &= \text{Prob}(S_{ij} + \varepsilon_{ij} > \mu_1) = 1/[1 + \exp(S_{ij} - \mu_1)] \\
\text{Prob}(E_{ij} = 2) &= \text{Prob}(\mu_1 < S_{ij} + \varepsilon_{ij} > \mu_2) = 1/[1 + \exp(S_{ij} - \mu_2)] - 1/[1 + \exp(S_{ij} - \mu_1)] \\
\text{Prob}(E_{ij} = 3) &= \text{Prob}(\mu_2 < S_{ij} + \varepsilon_{ij} > \mu_3) = 1/[1 + \exp(S_{ij} - \mu_3)] - 1/[1 + \exp(S_{ij} - \mu_2)] \\
&\vdots \\
\text{Prob}(E_{ij} = 7) &= \text{Prob}(\mu_6 < S_{ij} + \varepsilon_{ij}) = 1 - 1/[1 + \exp(S_{ij} - \mu_6)]
\end{aligned} \tag{4.1}$$

Estimation of the ordered logit model (Equation 4.1) provides parameter estimates of γ , β , and the ancillary parameters μ_1, \dots, μ_6 . The parameter estimates of γ indicate the effect of the policy attributes Z_{ij} on S_{ij} and therefore E_{ij}^* , the latent variable. However, these estimates do not indicate the effects on the probabilities in Equation 4.1. To compute these effects, we made additional computations.

Computing the Effects of the Policy Attributes

The general method of computing the policy effects involves two steps. First, we used the estimated parameters to predict the probabilities in Equation 4.1 for each observation under a base case, and then we used them to predict the probabilities for each individual under a series of simulated policy cases. The changes in the predicted probabilities relative to the base case represent the estimated effects of the policy attributes on the probabilities in Equation 4.1 for each observation. Second, we take the mean value of these changes across observations, using the post-stratification weights. The weighted mean is our estimate of the effect of the simulated policy.

How we implement this general method depends on whether the variable representing the policy case is a dichotomous variable, such as whether the loan repayment program was offered, that equals either zero or one, or a continuous variable, such as pay. The definitions of the base case and the policy cases differ. When the policy variable is a dichotomous variable, we predict the change in the probabilities when the variable equals one (the policy case) versus when it equals zero (the base case), while all other variables in the model, including the other policy attributes, are set to their actual values for each individual. The weighted mean difference in the probabilities is the estimate of the effect of the policy attribute, holding other factors in the model constant.

For example, in the case of the loan repayment program, we computed change in the probabilities for each observation in the case when the loan repayment program was offered (variable equaled one) and when it was not (variable equaled zero). The other variables in the model, including the other policy variables, were set to their actual values. The weighted mean difference in the probabilities in the case where the program was offered relative to the base case where it is not offered is our estimate of the effects of this program. The other dichotomous policy variables are the variables representing the requirement that individuals major in a vocational area, the requirement that individuals enlist in specific occupational fields, and the option to receive benefits for two versus four academic years.

However, when the policy variable is a continuous variable, we predict the change in the probabilities when the policy variable is increased by some specified amount (either a percentage or an absolute dollar increase) relative to the base case. In the base case all variables in the model, including the policy variable, equal their actual values in the data. Three policy variables are continuous: entry pay, entry bonus, and stipend amount. For these three variables, we consider two different types of policy simulations for estimating the effects of increasing the bonus amount, the level of entry pay, and the monthly stipend amount. First, we consider the effects on the probabilities of a 10 percent increase in each of their dollar values. Given mean values of \$9,000, \$25,000, and \$900 per month for the bonus, entry pay, and stipend policy attributes respectively (shown in Appendix G, Table G.1), a 10 percent increase represents a roughly \$900, \$2,500, and \$90 per month increment in each of these attributes. Because the dollar values of the 10 percent increase differ substan-

tially across the three attributes, we also considered the effects on the probabilities of the same absolute dollar increase in each attribute. Thus, we considered the effect of a \$3000 increase in the bonus amount, entry pay, and the annual stipend, respectively.

Although we can estimate the change in the predicted probabilities of responding at each level of interest (1 through 7), it is more convenient to predict the probabilities for the sum of the top three levels (5, 6, and 7), thereby providing estimates of the effect of each policy attribute on the probability of responding with the highest levels of enlistment interest. Specifically, for each observation we sum the predicted probabilities of responding with one of the top three response levels—for example, $\text{Prob}(E = 5) + \text{Prob}(E = 6) + \text{Prob}(E = 7)$ —under both the policy simulations and the base case and compute the difference. The weighted mean of this change across observations is an estimate of the effect of the policy attribute on the probability of responding in the top three rankings. Of course, we lose information by collapsing the top three categories in this way, but the results are easier to present and interpret. We report these estimates in Chapter Six.

It should be noted that our regression is modeled assuming that the random error term is correlated across responses for a given individual. This assumption accounts for the fact that a given individual provides responses to more than one program. The random factor for those responses may be correlated because of some individual-specific but unobserved effect, like taste for military employment. We accounted for this clustering effect when computing the sample size, as discussed earlier in the last chapter. We also accounted for the clustering effect in our estimated method. We estimated the ordered logit model and adjusted the standard errors to reflect the within-person correlation in the error term. The regression standard errors and results presented in Chapter Six reflect this adjustment.

Characteristics and General Attitudes of College Market Youth

This chapter presents descriptive statistics of the survey data. These statistics provide background to the regression results presented in the next chapter. We also discuss the responses to a host of attitudinal questions about the military and future plans. These responses provide additional background for the responses to the hypothetical policy programs and perhaps give some insight into the responses to those programs.

Descriptive Statistics

Table 5.1 presents frequencies of the variables representing background characteristics of the survey respondents.¹ Because of post-stratification weighting, the gender, race/ethnicity, and education proportions reflect the proportions in the population, as estimated from Current Population Survey data. Thus, about 45 percent of the respondents are male. Over 70 percent of the respondents are white while about 10 percent of the respondents report themselves as African American. About 4 percent are Asian and about 7 percent of the respondents report themselves as Hispanic.

As would be expected among young adults, relatively few are married. Only 1.7 percent of the overall sample is married. The figure is substantially higher among the dropout group, where 9.3 percent report themselves as married. Dropouts are more likely to have children. We find 11.7 percent of the dropouts have children, while only 2.6 percent of the high school seniors have one or more child and only 1.6 percent of the college students have children. The greater likelihood of being married and having children among dropouts may reflect their older ages. We find that 38.6 percent of the high school seniors are age 17, but none of the college students or dropouts is a minor. Over half of the high school seniors are age 18 while none of the respondents in the other groups are that age. About 41 percent of the college students and 34 percent of the dropouts are age 19, and over half of each group is age 20. Relatively few individuals in our sample are age 21, although dropouts have a higher percentage of these individuals than the college student group.

We find that a sizable fraction of the respondents report that their father served or is currently serving in one of the armed services, about 31 percent. The survey also sought to ascertain the respondent's household

¹ As noted in Chapter Three, the raw data have 352 high school senior respondents and 2,228 college group respondents, of which 211 are dropouts and the rest are college students. The total sample size is therefore 2,580. Because the raw data was more likely to be white females who are in college, we reweighted the data using post-stratification weights for gender, ethnicity, and education that we computed from the Current Population Survey. With the reweighting, we have 872 high school students, 1,423 college students, and 285 college dropouts for a total of 2,580 observations.

Table 5.1
Descriptive Statistics of Sample Respondents, by Group (Percent)

Characteristic	All (N = 2,580)	High School Seniors (N = 872)	College Students (N = 1,423)	Dropouts (N = 285)
Male	44.6	45.5	44.2	44.2
White	72.0	72.5	72.0	70.7
Black	10.2	10.2	9.7	13.0
Asian	4.2	3.3	5.2	2.6 ^b
Other race (not white)	13.5	14.0	13.1	13.7
Hispanic	7.3	8.0	6.8	8.1 ^b
Married	1.7	0.0	1.1 ^a	9.3 ^{a,b}
Have any children	2.6	1.6	1.3	11.7 ^{a,b}
Age = 17	13.1	38.6	0.0 ^a	0.0 ^{a,b}
Age = 18	17.9	52.6	0.2 ^a	0.0 ^{a,b}
Age = 19	27.0	2.1	40.7 ^a	34.3 ^a
Age = 20	36.0	1.2	53.1 ^a	57.6 ^a
Age = 21	1.2	0.2	1.2 ^a	3.7 ^a
Age = Missing	4.9	5.2	4.8	4.4
Father is/was in military	30.8	29.7	30.5	36.2
Household income less than \$26K	8.7	8.7	7.6	12.5 ^b
Household income between \$26K and \$75K	36.1	36.7	35.9	35.7
Household income over \$75K	28.4	25.6	32.3 ^a	20.0 ^b
Don't know or missing household income	26.8	29.0	24.1	31.9 ^b
Good student in high school	65.0	64.5	70.1 ^a	46.6 ^{a,b}
High school was academic rather than vocational	88.0	84.7	92.5 ^a	78.9 ^b
In four-year college program	45.3	0.0	70.8	25.8 ^b
In two-year college program	12.9	0.0	20.9	11.8 ^b
In vocational education program	1.6	0.0	2.2 ^a	3.5 ^a
Employed	64.8	57.5	65.7 ^a	82.5 ^{a,b}
Looking for work	13.7	15.5	13.5	9.4 ^{a,b}

Note: The data were reweighted resulting in group sample sizes that differ from those in the raw data.

^aStatistically different from the high school group percentage at the 5 percent level.

^bStatistically different from the college group percentage at the 5 percent level.

income (including their parents' income) because this is a factor known to correlate with the decision to enlist in the military. A sizable fraction—about a quarter of the respondents—reported that they did not know their household income. We find that the college student group has a higher percent of individuals in high income households while a higher fraction of college dropouts are from lower income households. We also find that college students were more likely to have achieved higher grades while in high school and to have attended an academically oriented high school.

We asked college students and dropouts their current academic level in terms of educational program. These respondents could report being in a two-year college program, a four-year college program, or in a vocational education program. (High school seniors were not asked this question.) We found that 45 percent of all respondents indicated that they were in a four-year program, 13 percent responded that they were in a two-year program, 2 percent in vocational postsecondary education programs, and the remainder (not shown) did not respond. These percentages partially reflect the post-stratification weighting based on educational group (high school senior, college student, and dropout). The fraction that is in a four-year program is substantially higher among the college student group. About 71 percent indicated that they were in a four-year college or university. The majority of the dropout group did not respond to this question. How-

ever, about 26 percent said that they were in a four-year program, suggesting that they were in a college or university before leaving.

The survey asked individuals about their current employment situation. Nearly two-thirds of the respondents report that they are employed. The largest fraction is among dropouts (82.5 percent), while the lowest is among high school seniors (57.5 percent).

Descriptive Analysis of Attitudinal Questions

The survey included several questions regarding the respondents' future plans and attitudes toward the military. It also included questions specifically targeted toward dropouts regarding why they left college before completing their degree and the actions they took as they were making that decision. This subsection summarizes the responses to those questions. For several questions, the respondent could check all of the answers that applied to them. Therefore, individuals could have provided multiple answers. As a result, the percentages in several of the tables do not sum to 100. The tables indicate the cases where multiple responses were possible.²

Future Plans

Table 5.2 presents the responses to the question that asked the respondents about what they might be doing in the next few years.

Table 5.2
Future Plans, by Group (Percent)

Question/Response	All (N = 2,580)	High School Seniors (N = 872)	College Students (N = 1,423)	Dropouts (N = 285)
Taking everything into consideration, what do you think you might be doing in the next few years? (check all that apply)				
Going to college full-time	77.7	82.8	82.1	40.0 ^{a, b}
Going to college part-time	14.6	14.5	9.3 ^a	41.2 ^{a, b}
Going to vocational, business, or trade school	5.5	7.0	3.2 ^a	12.6 ^{a, b}
Working full-time	28.1	11.4	31.9 ^a	60.0 ^{a, b}
Working part-time	43.8	49.1	42.7 ^a	33.5 ^{a, b}
Serving in the active military	2.2	2.7	1.4	4.2 ^b
Serving in the Reserve or National Guard	2.7	4.1	1.4 ^a	5.2 ^b
Staying at home or having a family	6.7	5.9	5.3	15.7 ^{a, b}
Doing nothing	0.6	0.6	0.7	0.8
None of the above	0.4	0.3	0.4	0.9

Note: The data were reweighted resulting in group sample sizes that differ from those in the raw data.

^aStatistically different from the high school group percentage at the 5 percent level.

^bStatistically different from the college group percentage at the 5 percent level.

The responses for the college student and college-bound high school senior groups are quite consistent in terms of magnitudes, but differ from the responses for the dropout group. A strong majority, about 83 percent, of the college students and the high school seniors indicated their plan to attend college full-time.

² It should also be noted that several of the questions were modeled after the questions contained in the YATS, fielded until 1999 by the Defense Manpower Data Center. The response categories are based on the categories in that survey. To ensure that the categories represented a complete set of alternative responses, we discussed the categories with participants in our three pretest groups and queried them about whether any category seemed to be missing. We modified the response categories to reflect their input.

A large percentage of each group, 42.7 percent and 49.1 percent respectively, indicated that they planned to work part-time in the future. In contrast, only 40 percent of the dropout group indicated that they planned to attend college full-time while the majority, 60 percent, said that they planned to work full-time. Only one-third of the dropout group said they planned to work part-time. These differences between the college dropout group and the other two groups may reflect the fact that the former group is somewhat older and perhaps more inclined to focus on employment given the higher fraction who have children and the impact of having a family on employment. It may also reflect the fact that they have already demonstrated an orientation that does not favor college by virtue of having left before completing their degree.

Attitudes Toward the Military

Respondents were also asked about their likelihood of serving in the military and, if they were to serve, the branch and type of service (active or reserve) they might consider. Table 5.3 presents a summary of the responses to these questions.³

Table 5.3
Military Propensity Questions and Responses, by Group (Percent)

Question/Response	All (N = 2,580)	High School Seniors (N = 872)	College Students (N = 1,423)	Dropouts (N = 285)
How likely is it that you will be serving in the military in the next few years? (check one)				
Definitely likely	1.7	2.4	1.0	3.3
Probably likely	4.2	6.1	2.6 ^a	6.5 ^b
Probably not likely	24.6	29.6	20.7 ^a	29.1 ^b
Definitely not likely	68.6	60.9	74.9 ^a	60.7 ^b
Missing	0.9	1.1	0.8	0.4
Which type of service would that be? (check one)				
Active duty	12.6	14.3	10.4 ^a	18.0 ^b
Reserves	32.8	32.3	33.0	32.9
Either	7.3	5.7	8.2	7.3
Not sure	49.7	41.3	39.9	33.5
Missing	7.7	6.4	8.5	8.2
If you were to join the military, which branches would you most likely consider? (check all that apply)				
Air Force	45.7	48.2	44.5	44.0
Army	23.6	22.1	23.5	28.4
Coast Guard	22.1	22.5	21.7	22.4
Marine Corps	21.3	21.8	21.5	19.2
Navy	29.2	28.0	29.8	30.0

Note: The data were reweighted resulting in group sample sizes that differ from those in the raw data.

^aStatistically different from the high school group percentage at the 5 percent level.

^bStatistically different from the college group percentage at the 5 percent level.

Positive military propensity is traditionally defined as the fraction of respondents who indicate that they are definitely likely or probably likely to serve in the military. Table 5.3 indicates that overall 5.9 percent of the respondents had a positive propensity. The figure was lowest for college students (3.6 percent), highest for the dropout group (9.8 percent), and in the middle for the college-bound high school senior group (8.5 percent).

³ The questions about attitudes toward the military came before the questions with the hypothetical policy programs. Thus, responses to the questions about military service are more likely to reflect interest in the current military programs, not the hypothetical programs in the survey.

The low rates are quite consistent with other survey results of youth propensity to enlist. For example, according to Bruce Orvis at RAND (2003), a 2000 RAND survey conducted for the Army of youth ages 16 to 24 and their parents indicated that 5 percent of youth with some college reported a positive propensity to enlist. Bourg (2002) analyzed the relationship between enlistment and college propensity in a survey of high school seniors nearing graduation, called Monitoring the Future (MtF). She found that those who claimed they definitely will graduate from a four-year college were nearly 40 percent less likely to state that they will probably serve in the military and 50 percent less likely to say they definitely will serve in the military.

Survey respondents were also asked about the type of service they would consider, active or reserve, and which branch of service they would consider. In the questions concerning branch, individuals could provide multiple answers. The highest fraction of respondents indicated that they would consider a reserve component. About one-third of them indicated the reserves while only 12.6 percent overall responded positively that they would serve in an active component. Consistent with our survey results, the Air Force garnered the most positive responses: 45.7 percent of the respondents indicated the Air Force, while 29.2 percent indicated the Navy. About 21 to 24 percent of high school seniors and college students positively indicated the Army and Marine Corps. Interestingly, 28.4 percent of the dropout group said they would most likely consider the Army.

The survey also queried individuals about the main reasons for why they would consider joining the military as well as the main reasons for why they would *not* consider serving. The summary of the responses to these questions is shown in Tables 5.4 and 5.5.

Table 5.4
Main Reasons for Joining Military, by Group (Percent)

Question/Response	All (N = 2,580)	High School Seniors (N = 872)	College Students (N = 1,423)	Dropouts (N = 285)
If you were to consider joining the military, what would be the main reasons? (check all that apply)				
Get away from family, personal situation, or hometown	9.4	7.8	8.1	20.4 ^{a, b}
Time to figure out what you want to do	16.0	17.6	14.0	21.3 ^b
Test yourself physically or mentally	39.4	40.8	37.7	43.1
Challenging or interesting work	32.9	33.5	32.1	34.7
Always wanted to be in the military	4.7	4.4	4.7	5.4
Military tradition in your family	7.1	6.2	7.0	9.9
Desire to serve your country	18.6	19.8	18.5	15.7
Few or no civilian job opportunities	3.7	2.6	4.0	5.5
Pay and allowances	29.6	30.8	27.0	38.7 ^{a, b}
Retirement pay and benefits	28.9	28.0	28.4	33.7
Security and job stability	21.8	21.1	20.6	30.5 ^{a, b}
Training in skills useful for civilian employment	25.6	25.6	24.4	31.5 ^b
Travel and new experiences	52.7	52.9	52.1	55.6
Money for college, college repayment, or education benefits and opportunities	57.5	62.2	53.4 ^a	63.7 ^b
Personal growth and maturity	32.3	31.1	31.9	38.3
None of the above	10.1	8.6	11.4	8.5

Note: The data were reweighted resulting in group sample sizes that differ from those in the raw data.

^aStatistically different from the high school group percentage at the 5 percent level.

^bStatistically different from the college group percentage at the 5 percent level.

Table 5.5
Main Reasons for Not Joining Military, by Group (Percent)

Question/Response	All (N = 2,580)	High School Seniors (N = 872)	College Students (N = 1,423)	Dropouts (N = 285)
What would be the main reasons you might NOT consider joining the military? (check all that apply)				
Pay/money	14.2	10.7	16.0 ^a	15.4
Interferes with my educational plans	50.2	47.2	56.6 ^a	27.0 ^{a, b}
Family obligations	17.2	13.0	18.0 ^a	26.0 ^{a, b}
Health/medical limitations	13.3	11.2	13.8	17.0 ^a
Against my beliefs/conscientious objector/opposed to killing	18.5	20.0	17.9	17.3
Don't like military lifestyle	50.2	46.2	53.3 ^a	47.0
Threat to my life	25.4	24.4	26.2	24.6
Not qualified to serve	5.5	4.3	5.8	7.3
Other career interests	55.1	52.2	59.3 ^a	42.8 ^{a, b}
Commitment is too long	34.1	31.7	35.3	35.2
Negative publicity	5.8	5.5	5.4	8.8
Other	9.3	8.7	8.8	12.9

Note: The data were reweighted resulting in group sample sizes that differ from those in the raw data.

^aStatistically different from the high school group percentage at the 5 percent level.

^bStatistically different from the college group percentage at the 5 percent level.

Across the groups, money for college (the third to last response category in Table 5.4) consistently rated high as a reason for serving in the military. We find that 62.2 percent of high school seniors, 63.7 percent of dropouts, and 53.4 percent of college students indicated that money for college and educational opportunities was a main reason for considering whether to join the military. Travel and new experiences also rated high, with 52.7 percent of the entire sample indicating this reason. Both reasons, money for college and travel, have often been found in other surveys as being key reasons youth consider serving in the military. Thus, these responses are consistent with evidence from the YATS and MtF.

There are some interesting differences between groups in reasons for joining the military. Among dropouts, such practicalities as pay, allowances, job security, retirement, and other benefits ranked quite high. For example, 38.7 percent of dropouts indicated pay and allowances as a main reason to serve in the military while only 27 percent of college students gave that reason. Getting away from family and one's hometown was another reason that was highly rated by dropouts. About 20 percent of dropouts gave this reason in contrast to about 8 percent of high school students and college students. High school seniors and college students were slightly more likely to indicate service to country. We find 19.8 percent of high school students and 18.5 percent of college students indicated this reason while only 15.7 percent of the dropouts gave this reason.

The responses to the question asking about the main reasons for not joining the military also differed across groups. The majority of the college student sample, 50.2 percent, said that military service interfered with their educational plans. About 47 percent of the high school students said that it interfered with their educational plans, but only 27 percent of the dropouts gave this reason. The relatively low percentage among dropouts seems logical given that dropouts have already chosen to leave college. But, the relatively high percentage among college students and high school seniors suggests that many in the college market currently view military service as a substitute for college. That is, they see these pursuits as mutually exclusive. Not surprisingly, many in the college market have a low propensity to serve in the military, as shown in Table 5.3. It seems likely that programs that allow college before accession are likely to be attractive to those in the college market because they make college and enlistment complements rather than substitutes. Perhaps reflecting their

older ages and presence of children, a higher fraction of dropouts than high school seniors or college students stated family obligations as reason for not joining the military.

One area of agreement among respondents was with respect to the military lifestyle. A large fraction of respondents in each group provided "don't like the military lifestyle" as a main reason for not serving. We find 53.3 percent of the college student group, 46.2 percent of the high school student group, and 47 percent of the dropout group gave this reason. Although the survey did not delve into how respondents defined the military lifestyle and why they did not like it, the pretest participants were queried in the context of a structured discussion group about their views toward the military. As detailed in Appendix D, participants in all three groups consistently made comments that suggested that they thought that the military was too regimented, overly rule-bound, and required more discipline than they were accustomed to or desired with respect to behavior and dress.

Questions for Dropout Group

In addition to the extra hypothetical program options that were designed specifically for the dropout group, the survey questionnaire also included two questions aimed at understanding why individuals left college before completing their degree and what actions they took at the time they made that decision. Table 5.6 summarizes the responses to these two questions.

Table 5.6
Reasons for Dropping out of College and Actions Taken at Time of Decision, Dropouts Only (Percent)

What were the main reasons for leaving college before completing your degree? (check all that apply)		When you were deciding to leave college, did you take any of the following actions? (check all that apply)	
Did not have the money	38.7	Discussed alternative plans with a parent, spouse, or other family member	47.2
Needed to work because of family obligations	19.7	Discussed alternative plans with a professor or school counselor	10.6
Needed to stay home because of family obligations	9.9	Discussed alternative plans with a friend	39.7
Health reasons or physical disability	2.7	Searched for a job in the want ads in the local newspaper	34.2
Lacked child care	4.0	Searched for a job in the want ads in the school newspaper	5.1
Had transportation problems	11.5	Searched for a job at the school employment center	8.5
Tired of going to school	30.7	Searched the Internet for a job	22.8
Grades weren't good enough for college	14.8	Contacted a friend or relative about a job	33.9
Was taking too long to get a degree	7.1	Contacted an employer directly for an interview	26.1
Family didn't want me to continue	0.5	Contacted a private or public employment agency	10.3
School didn't meet expectations/disappointed by classes and teachers	28.7	Looked at a military recruiting Web site and other military recruiting materials	5.2
Other	29.7	Talked to a military recruiter	8.6
		Sent out resumes or filled out job applications	31.8
		Did nothing	5.8
		None of the above	3.8

With regard to the main reasons for leaving college without completing a degree, the most frequently cited reason among the offered alternatives was money for college. We find that 38.7 percent of the dropouts said that they left college because they lacked the financial resources to continue. A policy implication of this finding is that dropouts may be responsive to financial incentives that improve their ability to pay for their col-

lege education. An important purpose of the hypothetical policy options is to provide estimates of enlistment interest under a variety of options that would provide such incentives.

Another popular reason given is “tired of going to school” as is “didn’t meet expectations.” We find 30.7 percent of the dropouts gave the first of these reasons and 28.7 percent gave the second of these as a reason for leaving college. Both responses indicate that these respondents simply did not like going to school. Unfortunately, despite our efforts to identify the range of responses to this question as part of our pretest discussion with a group of college dropouts (see Appendix D), we found that a large fraction of the survey respondents still said “other” as a reason for leaving college. It is not clear what those other reasons might be.

The responses to the question about actions taken when deciding to leave college suggest that seeking the input of key “influencers” such as parents, spouses, family members, and friends was the most important action taken by the respondents. We find that 47.2 percent of the dropouts discussed alternative plans with family members while 39.7 percent discussed alternative plans with a friend. About 34 percent contacted a family member or friend about a job. We find that relatively few individuals contacted a military recruiter or looked at military recruiting material. Specifically, only 5.2 percent looked at recruiting material and 8.6 percent contacted a recruiter. The Internet was also somewhat popular, with 22.8 percent stating that they used the internet to look for a job. These responses suggest that providing information and materials, including advertising messages, to key influencers might help improve military recruiting among college dropouts.

Estimated Effects of Recruiting Policies on Enlistment Interest

This chapter presents our regression results. The regression model that is estimated was discussed in Chapter Four. In brief, the model is an ordered logit regression model of the effects of five different policy attributes and their interactions with each other and with other variables such as gender on the probability of indicating a response category of 1 to 7 on a question about likelihood of enlisting under the program with those attributes. The model also includes a number of variables capturing the effect of different background characteristics on the likelihood of responding with a response category of 1 to 7.

To present the estimated effect of the policy attributes on the probabilities of responding with each response category or ranking (i.e., 1 to 7), we simulate the probabilities for each observation, using the estimated model, under a base case and under alternative policy changes. The change in the probabilities relative to the base case indicates the estimated effect of changing the policy attribute on the probabilities. We summarize the effects on the probabilities as a result of a given hypothetical policy change by summing the effects on the probabilities of stating a ranking of 5, 6, or 7, the top three rankings. We report the mean weighted change in the probability of stating a ranking of 5, 6, or 7.

Before discussing the regression results, we make a few observations about how we reconfigured the survey data to conduct the analysis, how the sample size changed, and what the overall responses to the hypothetical policy programs were.

Data Construction for the Regression Analysis

To conduct the analysis, we reconfigured the data so that each observation or record corresponded to a program response. Therefore, each dropout provided 12 observations because each one was asked to respond to 12 different programs. Each high school senior and college student provided nine observations because each of them was asked to respond to nine different programs. As discussed in Chapter Three, we received 352 eligible high school responses and 2,228 eligible college and dropout responses, for a total of 2,580 total eligible responses. Of the eligible college group, there were 211 dropouts and 2,017 college students. Since each of the 211 dropouts provided answers to 12 different programs, we have 2,532 (211×12) observations for the dropouts. Since each of the 2,369 ($352 + 2,017$) high school students and college students answered nine questions, we have 21,321 observations for them. Thus, in total we have 23,853 observations in our analysis file. Because some individuals failed to provide responses to some of the programs, we have 879 observations with missing responses. Consequently, our analysis file has 22,974 usable responses. As noted earlier, we adjusted

the standard errors of the regression model to account for a potential cluster effect created by the fact that a single individual provides multiple responses, thereby creating the possibility of a correlation in the error term across observations and a downward bias in the standard errors of our estimates.

Overview of Responses to Hypothetical Programs

Table 6.1 shows the weighted frequency distribution of the responses to the hypothetical programs. The most notable aspect of the responses is the large percentage of individuals who indicated a relatively high level of interest.

Table 6.1
Distribution of Responses to Hypothetical Policy Programs, by Group, Weighted (Percent)

Question/Response	All (N = 22,974)	High School Seniors (N = 3,023)	College Students (N = 17,528)	Dropouts (N = 2,423)
On a scale of 1 to 7, where 1 means definitely not likely and 7 means definitely likely, how likely is it that you would serve on active duty in the military if you were offered this program? (check one)				
1 = Definitely not likely	24.4	18.8	27.9	23.7
2 = Probably not likely	14.7	17.4	14.6	9.3
3 = Somewhat not likely	10.5	11.5	10.4	8.5
4 = Not sure	16.1	19.2	13.7	17.8
5 = Somewhat likely	18.1	18.8	17.7	18.0
6 = Probably likely	11.9	10.7	11.2	17.1
7 = Definitely likely	4.3	3.4	4.5	5.8
Categories 5, 6, and 7 (positive propensity)	34.3	32.9	29.4	40.9

The final row shows the percentage of each group that responded positively (i.e., with a ranking of 5, 6, or 7). This percentage indicates the fraction with a stated positive propensity to enlist under each program. The table shows that about one-third of the high school responses and 29.4 percent of the college student responses to the hypothetical programs indicated a positive propensity. Among the dropout group responses, positive propensity is over 40 percent, or about 7 percentage points greater than it is for the high school group. The propensities for the college and dropout groups are statistically different from the propensity for the high school group at the 5 percent level. It is important to note that the propensity levels shown in Table 6.1 are not directly comparable to the levels shown in Table 5.4 because the number of response categories for these questions differs (seven in the case of the hypothetical programs and four in the case of the responses shown in Table 5.4).

The figures in Table 6.1 are averages and do not control for differences in background characteristics such as gender. The regression model described in Chapter Four allows us to predict the probability of stating a positive propensity level, holding other observed characteristics constant. The estimation results of the ordered logit model as well as the means and standard deviations of the covariates and dependent variable are shown in Table G.1 in Appendix G.

When we control for background characteristics, the weighted, mean predicted probability of stating an enlistment level of 5, 6, or 7, is 35.6 percent for the college-bound high school seniors, 34 percent for the college student group, and 36.3 percent for the recent college dropout group. Comparing these predicted probabilities with those in Table 6.1 shows that the differences in the predicted propensity levels between the three groups are much smaller when observed background characteristics are held constant. The difference in

the predictions for the dropout group relative to the high school group is less than 1 percentage point (36.3 percent – 35.6 percent). Using a chi-square test of the joint significance of the coefficient estimates for the college-and dropout-related variables in the regression model, the predicted probabilities for the college group and dropout group are statistically different from the probabilities for the high school group. Yet, they are small in magnitude. We conclude that much of the difference between the groups in the raw responses to the hypothetical policy option is attributable to background characteristics.

Estimated Effects of the Policy Attributes

As discussed in Chapter Four, the regression results tell us the effect of each variable on the logit index function S . They do not tell us the effect on the probabilities of responding with an interest level of 1 to 7. We computed the estimated effects on the probabilities of responding at each level of enlistment interest (1 to 7) and in the top three levels (5 to 7) as discussed earlier and as shown in Tables 6.2 through 6.5. Because there are statistically significant interactions between the policy attributes and gender, we present the results for all observations and for males only. It is important to note that all of the predictions and estimated effects shown in Tables 6.2 through 6.5 are for programs that allow individuals to attend college before accession, as under the Army's College First program. Therefore, the analysis provides information on the relative effects of alternatives that would improve current college-before-accession programs, such as the College First program. It does not provide information on the effect of a college-before-accession program relative to current policies, such as the College Fund, that only allow college during or after an enlistment obligation.

As discussed below, Table 6.6 shows the estimated effects on the probabilities of the various policy attributes for dropouts who were given the option to enlist without returning to college. Therefore, Table 6.6 shows two sets of predicted effects for dropouts. The first is for programs that allow them to return to college before accession, and the second is for programs *not* allowing them to return to college before accession.

The tables show both the predicted probabilities and the change in the predicted probability of stating a positive propensity (i.e., of stating a level of 5, 6, or 7) relative to the base case. They also show the percent change in the probability of stating a positive propensity. To test for statistical significance of the estimated effects of the policy attributes we report the results of a chi-square test of the joint significance of the variables pertaining to a given policy attribute. Where appropriate, we also report the level of significance of the estimates of the interaction of the policy attribute variables and the other variables such as gender. The next several subsections discuss the specific results of the simulations.

Estimated Effects of Pay, Bonuses, and the College Stipend

Table 6.2 shows the results for three policy attributes: entry pay, enlistment bonuses, and college stipend benefits. The first column shows the mean predicted probabilities under the base case where all variables in the model are set at their actual level and we computed the weighted, mean predicted probabilities using the model estimates. Using our estimated model, we find that the mean predicted probability of responding with an interest level of 5 or higher is 34.6 percent, consistent with the mean level of positive propensity of 34.3 percent shown earlier in the first column of Table 6.1.

The next column in Table 6.2 shows the effect of increasing the enlistment bonus by 10 percent on the predicted probability of stating a positive propensity of enlistment. Since the average bonus amount was about \$9,000, the 10 percent increase represents about \$900. The third column shows the effect of increasing entry pay by 10 percent or about \$2,700, and the fourth shows the effect of increasing the monthly col-

Table 6.2
Predicted Probabilities of Enlistment Interest Level: Policy Simulations of a Change in Entry Pay, Bonus Amounts, and Tuition Stipends

Predicted Probabilities/ Policy Attribute	Base Case (1)	10 percent Increase in Bonus (2)	10 percent Increase in Pay (3)	10 percent Increase in Monthly Stipend (4)	\$3,000 Increase in Bonus (5)	\$3,000 Increase in Pay (6)	\$3,000 Increase in Monthly Stipend (7)
All							
Prob (E = 1)	0.242	0.240	0.207	0.233	0.233	0.202	0.229
Prob (E = 2)	0.146	0.145	0.135	0.143	0.143	0.133	0.142
Prob (E = 3)	0.104	0.104	0.101	0.104	0.104	0.100	0.103
Prob (E = 4)	0.161	0.161	0.164	0.162	0.162	0.164	0.162
Prob (E = 5)	0.182	0.183	0.200	0.187	0.187	0.201	0.188
Prob (E = 6)	0.121	0.122	0.142	0.126	0.125	0.145	0.128
Prob (E = 7)	0.044	0.044	0.054	0.046	0.046	0.055	0.047
Prob (E = 5,6,7)	0.346	0.350	0.395	0.358	0.358	0.401	0.363
Change in Prob (E = 5, 6, and 7)		0.004	0.048	0.012	0.012	0.055	0.017
Percent Change in Prob (E = 5, 6, and 7)		0.010 ^a	0.145 ^a	0.035 ^a	0.035 ^a	0.166 ^a	0.051 ^a
Males							
Prob (E = 1)	0.227	0.224	0.186	0.217	0.216	0.182	0.212
Prob (E = 2)	0.142	0.141	0.127	0.139	0.139	0.125	0.137
Prob (E = 3)	0.103	0.103	0.098	0.102	0.102	0.097	0.102
Prob (E = 4)	0.163	0.163	0.164	0.164	0.164	0.165	0.164
Prob (E = 5)	0.189	0.191	0.209	0.194	0.195	0.211	0.197
Prob (E = 6)	0.128	0.130	0.154	0.134	0.135	0.158	0.137
Prob (E = 7)	0.047	0.048	0.060	0.050	0.050	0.062	0.051
Prob (E = 5, 6, and 7)	0.365	0.369	0.423	0.378	0.379	0.431	0.384
Change in Prob (E = 5, 6, and 7)		0.004	0.058	0.014	0.014	0.067	0.020
Percent Change in Prob (E = 5, 6, and 7)		0.011 ^b	0.168 ^b	0.039 ^b	0.041 ^b	0.192 ^b	0.057 ^b

Notes: Predicted probabilities derived from coefficient estimates in Table G.1, Appendix G.

^a A chi-square test statistic of the joint significance of the parameter estimates of the policy attribute variables is statistically significant from zero at the 5 percent level.

^b The parameter estimate of the interaction of the policy attribute variable and the variable indicating the individual is male is statistically significant from zero at the 5 percent level.

lege stipend by 10 percent. Since the average monthly stipend was \$900, the 10 percent increase represents about \$90.

We estimate that raising the bonus by 10 percent increases the predicted probability of responding in the top three categories by 1.0 percent relative to the base case. Raising entry pay by 10 percent is predicted to increase the predicted probability of stating a positive propensity level by 14.5 percent. Finally, raising the monthly stipend benefit by 10 percent is predicted to increase the predicted probability by 3.5 percent. The estimated effects of these three policy attributes on the probability of stating a higher enlistment interest level are statistically significant from zero at the 5 percent level.

The estimated effects for males only, shown in the bottom panel of Table 6.2, are larger than they are for the sample overall. Thus, the estimated change in the predicted probability of stating a positive propensity level as a result of a 10 percent increase in the bonus amount, entry pay, and stipend amount, is 1.1 percent, 16.8

percent, and 3.9 percent, respectively. The effects for males relative to all respondents (shown in Table G.1) is statistically different from zero at the 5 percent level. The main result, for the entire sample as well as for the male subsample, is that of the three types of benefits (pay, stipend, bonuses) pay has the largest effect, followed by the stipend, and then by the bonus effect.

The relative ranking of these policies and the magnitude of their estimated effects are similar to estimates of the effect of bonuses and pay on high-quality enlisted supply. For example, Warner, Simon, and Payne (2001) estimate that a 10 percent increase in enlistment bonuses results in a 1.2 percent increase in Army high-quality enlistment contracts. They also estimate a relative military pay elasticity of about 1, meaning that a 10 percent increase in relative military pay results in a 10.5 percent increase in Army high-quality enlistment contracts. Dertouzos and Garber (2003) also find a unitary pay elasticity in their analysis of high-quality enlisted supply. That these estimates are close to the estimated effects that we find of bonuses and pay on the probability of expressing a positive enlistment propensity under a series of hypothetical policy options suggests that estimates in various enlisted supply studies of the effects of pay and bonuses are highly robust.

The estimated effect of the monthly stipend is also similar to the effect of educational benefits found in the Warner, Simon, and Payne (2001) study. That study found that a 10 percent increase in the value of College Fund benefits resulted in a 4.7 percent increase in Army high-quality enlistment contracts. College Fund educational benefits represent an additional college stipend, on top of the MGIB stipend, offered to individuals who meet the various eligibility requirements, including a minimum service obligation. Unlike the college-before-accession options considered in this study, the College Fund and the MGIB require individuals to complete a service obligation before they are eligible to receive the college benefit. Still, our estimate of 3.9 is similar to their estimate of 4.7.

Because the dollar magnitudes of pay, bonuses, and stipends differ, a 10 percent increase in each policy represents different dollar increments. An alternative way to compare the effects of increasing pay, bonus amounts, or stipend benefits is to estimate the change in the predicted probabilities of an equal dollar increase in each policy. The last three columns of Table 6.2 show such a comparison. Specifically, it shows the estimated change in the probability of stating a positive propensity resulting from a \$3,000 increase in entry pay, enlistment bonus, and total stipend amount. Because the stipend was either offered for two academic years (or 18 months) in some scenarios and for four academic years (or 36 months) in other scenarios, the stipend was incremented by \$167 per month for the two-year scenarios ($\$167 \times 18 = \$3,000$) and by \$83 per month for the four-year scenarios ($\$83 \times 36 = \$3,000$). We find that estimated effects of the bonus and stipend on the probability of stating a positive propensity increase, but the effect of pay is still larger, as before. Thus, we find that increasing pay, bonuses, or the stipend amount by \$3,000 increases the predicted probabilities of stating a positive propensity by 16.6 percent in the case of pay, by 3.5 percent in the case of the bonus, and by 5.1 percent in the case of the stipend. Thus, pay still has the largest effect, followed by the stipend, and then the enlistment bonus.¹ As before, the estimated effects for males are larger than they are for the sample overall.

In sum, the results in Table 6.2 regarding the effects of pay, bonuses, and stipends indicate that within the context of a college-before-accession program, college market youth are most responsive to increases in pay, followed by increases in stipend amounts and increases in bonus amounts. The relative size of these effects is about the same as past estimates of the enlisted supply responses of high-quality youth. These results suggest

¹ Because tuition stipend benefits are paid while an individual is in school, and pay and bonuses are paid later, when he or she enters active duty, the timing of payment of these three policy attributes differs, thereby raising the question of whether the dollar amounts should be discounted to reflect the timing differences. Our estimates in Table 6.2 assume that individuals fully understood the implications of the instructions and program descriptions given in the survey and therefore incorporated the timing differences in their responses. Therefore, we do not incorporate discounting in the results reported in Table 6.2. If respondents did not incorporate these timing differences, then the results in Table 6.2 are overestimates of the effects of pay and bonuses and underestimates of the effect of the stipend. As discussed in the next chapter, we incorporate the timing differences when we compute the cost of the different policies.

that recent improvements to military pay will increase the attractiveness of the military, including the college-before-accession option. They also suggest that another way the services might increase the attractiveness of the college-before-accession option is to increase the monthly college stipend.

Estimated Effect of the \$65,000 Loan Repayment Option

Table 6.3 shows the effect on the probability of stating a positive propensity of offering a \$65,000 LRP as part of a program that allows college before accession. The first column shows the model's predicted probabilities of each enlistment interest level in the base case where all variables in the model are set equal to their actual values for each observation except for the LRP, which is set to zero, implying that no LRP is offered. The second column shows the predicted probabilities when the LRP is offered and all other variables are set to their actual values. The figures in the table are the weighted, mean predicted probabilities for all observations in the top panel and for males only in the bottom. The table also shows the mean changes in the predicted probability of answering in the top three response levels.

Table 6.3
Predicted Probabilities of Enlistment Interest Level: Policy Simulation of Offering the Loan Repayment Program

Predicted Probabilities/Policy Attribute	Base Case, No \$65K Loan Repayment Program (1)	Policy Case, \$65K Loan Repayment Program (2)
All		
Prob (E = 1)	0.261	0.150
Prob (E = 2)	0.151	0.111
Prob (E = 3)	0.105	0.090
Prob (E = 4)	0.158	0.160
Prob (E = 5)	0.174	0.225
Prob (E = 6)	0.112	0.186
Prob (E = 7)	0.040	0.078
Prob (E = 5, 6, and 7)	0.326	0.488
Change in Prob (E = 5, 6, and 7)		0.163
Percent Change in Prob (E = 5, 6, and 7)		0.536 ^a
Males		
Prob (E = 1)	0.251	0.138
Prob (E = 2)	0.148	0.104
Prob (E = 3)	0.105	0.086
Prob (E = 4)	0.160	0.158
Prob (E = 5)	0.178	0.230
Prob (E = 6)	0.117	0.198
Prob (E = 7)	0.042	0.085
Prob (E = 5, 6, and 7)	0.337	0.513
Change in Prob (E = 5, 6, and 7)		0.177
Percent Change in Prob (E = 5, 6, and 7)		0.562 ^a

Notes: Predicted probabilities derived from coefficient estimates in Table G.1, Appendix G.

The parameter estimate of the interaction of the policy attribute variable and the variable indicating the individual is male is statistically significant from zero at the 5 percent level.

^a A chi-square test statistic of the joint significance of the parameter estimates of the policy attribute variables is statistically significant from zero at the 5 percent level.

The LRP program is estimated to have a substantial effect on the positive enlistment propensity probability. We estimate an effect of 53.6 percent overall and of 56.2 for males. These estimates are statistically significant at the 5 percent level.

It is important to recognize that the estimated percent change in the probability of a positive stated propensity for the LRP is not directly comparable with the estimated effects of a 10 percent change in pay, bonuses, and stipends reported in the previous subsection. The reason is that the estimated effects of the LRP show the effect of the program relative to the case where the program is not offered. In contrast, the estimated effects of pay, bonuses, and stipends are computed relative to the case where pay, bonuses, and stipends are offered, but the amounts are 10 percent, or \$3,000, larger.

We find (not shown in the table) that if pay were increased by 35 percent, rather than by 10 percent, the percent change in the probability of a positive propensity among the high school senior group would be the same magnitude as the effect of the LRP program. In other words, to achieve the same effect on positive enlistment propensity as the LRP approach would, entry pay would have to rise by \$8,000 or about 35 percent over and above the level offered in the base case in Table 6.2. Similarly, to achieve the same effect as the loan repayment approach, the monthly stipend would have to be raised to \$2,100 per month. Finally, to achieve the same effect as the loan repayment approach shown in Table 6.2, the enlistment bonus amount would have to increase to \$50,000. While all of these policy alternatives would achieve the same predicted effect on the probability of expressing a positive enlistment propensity, they do not have equal cost. The relative cost-effectiveness of different alternatives is discussed in the next chapter.

Estimated Effect of College Major and Military Career Field Requirements

The hypothetical policy programs also included attributes related to the choice of college major and the choice of military career field. As discussed in Chapter Three, some policy programs told survey respondents that they would be required to major in a vocational field, such as engineering, mechanics, health, computers, and so forth. Other policy programs told them that they could major in any field that led to a college degree. Furthermore, some policy programs told respondents that they would be required to enter a technical military occupation, while other programs told them that they could enter any career field for which they qualified and that was open at the time of enlistment. We included variables in the regression model that captured the effect of these requirements on the probability of expressing a given level of enlistment interest. As shown in Table 6.4, we used the estimated coefficients to simulate the effect of these requirements on the probability of expressing a positive propensity.

Table 6.4 shows that both requirements have a negative effect on the probability of expressing a positive enlistment propensity. Limiting the choice of college major to vocational areas reduces the probability by 16.6 percent. The negative effect is smaller for males, with a reduced probability of 12 percent relative to the base case for males in the sample. Both estimates are statistically significant at the 5 percent level.

The effects of limiting the military career field on the probability of expressing a positive enlistment propensity are also negative. Such a limitation reduces the probability of stating a positive enlistment propensity by 15.2 percent overall relative to the base case. Again, the negative effect is smaller for males, only 6.7 percent. And again, these changes are statistically significant at the 5 percent level. Thus, limitations on the military occupational field have a negative effect on enlistment propensity, other factors held constant.

Our model included interactions of the policy attributes with the college market segment. In nearly every case, these interactions were not statistically different from zero at the 5 percent level.² The exception was the

² To conserve on degrees of freedom, we excluded the nonsignificant interactions in our final model specification shown in Appendix G.

Table 6.4
Predicted Probabilities of Enlistment Interest Level: Policy Simulations of Requiring a Vocational College Major or a Technical Military Career Field

Predicted Probabilities/ Policy Attribute	Base Case, No Requirement That College Major Is Vocational (1)	Policy Case, Requirement That College Major Is Vocational (2)	Base Case, No Requirement That Military Career Field Is Technical (3)	Policy Case, Requirement That Military Career Field Is Technical (4)
All				
Prob (E = 1)	0.218	0.268	0.218	0.264
Prob (E = 2)	0.140	0.153	0.139	0.152
Prob (E = 3)	0.103	0.106	0.103	0.106
Prob (E = 4)	0.164	0.157	0.164	0.158
Prob (E = 5)	0.193	0.170	0.194	0.172
Prob (E = 6)	0.133	0.108	0.133	0.109
Prob (E = 7)	0.049	0.038	0.049	0.039
Prob (E = 5, 6, and 7)	0.375	0.315	0.376	0.320
Change in Prob (E = 5, 6, and 7)		-0.060		-0.056
Percent Change in Prob (E = 5, 6, and 7)		-0.166 ^a		-0.152 ^a
Males				
Prob (E = 1)	0.210	0.244	0.217	0.236
Prob (E = 2)	0.137	0.148	0.139	0.145
Prob (E = 3)	0.102	0.105	0.102	0.104
Prob (E = 4)	0.165	0.161	0.164	0.162
Prob (E = 5)	0.197	0.181	0.194	0.185
Prob (E = 6)	0.137	0.118	0.134	0.123
Prob (E = 7)	0.051	0.042	0.050	0.044
Prob (E = 5, 6, and 7)	0.386	0.341	0.378	0.352
Change in Prob (E = 5, 6, and 7)		-0.044		-0.024
Percent Change in Prob (E = 5, 6, and 7)		-0.120 ^b		-0.067 ^b

Notes: Predicted probabilities derived from coefficient estimates in Table G.1, Appendix G, and formulas in Chapter Four (Equation 4.1).

^a A chi-square test statistic of the joint significance of the parameter estimates of the policy attribute variables is statistically significant from zero at the 5 percent level.

^b The parameter estimate of the interaction of the policy attribute variable and the variable indicating the individual is male is statistically significant from zero at the 5 percent level.

case of occupational field requirements. Table 6.5 shows the results of the effect of imposing a military career field requirement by college market segment. For each segment, the table shows the mean predicted probabilities in the case when no requirement was imposed (the base case) and the case when it was (the policy case).

We find that imposing the requirement regarding military occupational area has the least negative effect among high school seniors while both college students and recent college dropouts have a substantially larger negative effect. For college-bound high school seniors, the requirement that one's military career field be a technical area, rather than any area for which the individual qualified, reduced the probability of stating a positive propensity by 7.5 percent on average. For college students and recent dropouts, the reduction was 17.4 percent and 22 percent, respectively.

It is possible that high school seniors are the least wedded to their future choice of major and occupational area, and therefore are the least likely to view limitations of their choices as a negative attribute of enlistment. The military has traditionally targeted their recruitment efforts on high school students, particularly seniors.

Table 6.5
Predicted Probabilities of Enlistment Interest Level: Policy Simulations of Requiring a Technical Military Career Field, by College Market Segment

Predicted Probabilities/Policy Attribute	High School Seniors, Base Case (No Requirement) (1)	High School Seniors, Policy case (with Requirement) (2)	College Students, Base Case (No Requirement) (3)	College Students, Policy Case (with Requirement) (4)	College Dropouts, Base Case (No Requirement) (5)	College Dropouts, Policy Case (with Requirement) (6)
Prob (E = 1)	0.220	0.243	0.231	0.285	0.173	0.239
Prob (E = 2)	0.141	0.147	0.144	0.157	0.122	0.146
Prob (E = 3)	0.104	0.105	0.105	0.106	0.100	0.105
Prob (E = 4)	0.164	0.161	0.163	0.155	0.166	0.162
Prob (E = 5)	0.192	0.182	0.187	0.162	0.216	0.184
Prob (E = 6)	0.130	0.120	0.124	0.100	0.163	0.121
Prob (E = 7)	0.048	0.043	0.045	0.034	0.064	0.044
Prob (E = 5, 6, and 7)	0.371	0.343	0.357	0.296	0.443	0.348
Change in Prob (E = 5, 6, and 7)		-0.027		-0.060		-0.094
Percent Change in Prob (E = 5, 6, and 7)		-0.075 ^a		-0.174 ^a		-0.220 ^a

Notes: Predicted probabilities derived from coefficient estimates in Table G.1, Appendix G.

^a A chi-square test statistic of the joint significance of the parameter estimates of the policy attribute variables is statistically significant from zero at the 5 percent level.

These results suggest that limitations on the occupational choices of high school seniors do not appear to be a strong detriment to their enlistment intentions overall, all other variables held constant. However, the relatively large estimated negative effects for college students and dropouts suggest that such limitations might be an important detriment for these groups on average.

Overall, these results suggest that restrictions are generally viewed negatively, other factors held constant. However, if these requirements are imposed on a limited but targeted group of individuals, such as those already majoring in vocational areas or those who already have an interest in technical career fields, such requirements may not have a negative effect and may even have a positive effect. Our results do not provide information on whether the effect would be positive or negative for these individuals. They do indicate that overall these restrictions are viewed negatively, with males and high school seniors having the least aversive reaction.

Thus, if and when the services develop programs that are broadly applied to individuals in the college markets, they might want to put fewer restrictions on the choices of college major and occupational area. The Navy has tended to have such requirements in its tech-prep and CASH programs. However, these are relatively small-scale programs that are targeted to specific groups of individuals. The results in Table 6.4 suggest that such requirements will be unattractive, on average, to the college market overall but could be attractive to subgroups of recruits.

Direct Enlistment for College Dropouts

In addition to the hypothetical policy options that allowed them to return to college before accession, college dropouts were presented with options that allowed them to directly enter into the military without returning to college. Table 6.6 shows the change in the probability of expressing a positive propensity when dropouts were presented with options that allowed them to enter directly into the military.

The first column shows the mean predicted probability of expressing a positive enlistment level among dropouts for the 36 college-before-accession options. These 36 are the same 36 offered to the high school

seniors and college students. The second column shows the mean predicted probability among dropouts for the 12 additional policy options that allowed direct enlistment, without returning to college. A question of interest is whether dropouts seem to prefer enlisting directly into the military without returning to college over a program that would allow them to return to college before entering the military. We find that on average, dropouts facing a college-before-accession option have a 33.3 percent probability of responding in the top three categories of enlistment interest, as discussed earlier in this chapter. However, in response to options that do not require that they return to college, the probability of having a positive propensity rises to 38.7 percent.³ Although not all of the individual variables that capture the direct enlistment option for dropouts are statistically significant at the conventional levels, as shown in Table G.1 in Appendix G, we find that they are jointly significant, with the chi-square test statistic of 24.97 that is significant at the 1 percent level. Therefore, the probability of expressing a positive level of enlistment interest among dropouts is higher when they face a set of policy attributes that allow them to directly enlist, rather than return to college before entering the military, and this effect is statistically significant at the 5 percent level.

The positive effect of the direct enlistment option is muted somewhat if the program involves a requirement to enter a technical military career field. Columns three and four in Table 6.6 show the mean predicted probabilities when such a requirement is in place. For the college-before-accession option, the mean predicted probability is 29.1 percent and is 31.5 percent for the direct enlistment option. While the mean propensity probability is still higher under the direct enlistment option, the improvement is only 2.4 percentage points or about 8 percent. As shown in Table 6.5, we found that the negative estimated effect of restrictions on military career field was largest for the dropout group. The results in Table 6.6 show that dropouts who are given the option to directly enlist into the military have the strongest negative reaction to the military career field restriction.

Table 6.6
Predicted Probabilities of Enlistment Interest Level: Policy Simulations of Effect of Direct Enlistment Program Among College Dropouts

Predicted Probabilities/ Policy Attribute	Dropouts, College Before Accession (1)	Dropouts, Direct Enlistment (2)	Dropouts, College Before Accession with Military Career Field Requirement (3)	Direct Enlistment, with Military Career Field Requirement (4)
Prob (E = 1)	0.250	0.214	0.284	0.265
Prob (E = 2)	0.150	0.136	0.160	0.154
Prob (E = 3)	0.106	0.101	0.108	0.107
Prob (E = 4)	0.161	0.162	0.156	0.159
Prob (E = 5)	0.178	0.196	0.161	0.171
Prob (E = 6)	0.114	0.139	0.097	0.107
Prob (E = 7)	0.041	0.053	0.033	0.037
Prob (E = 5, 6, and 7)	0.333	0.387	0.291	0.315
Change in Prob (E = 5, 6, and 7)		0.054		0.024
Percent Change in Prob (E = 5, 6, and 7)		0.162 ^a		0.084 ^a

Notes: Predicted probabilities derived from coefficient estimates in Table G.1, Appendix G.

^a A chi-square test of the joint significance of the parameter estimates of the policy attribute variables is statistically significant from zero at the 5 percent level.

³ Earlier in the chapter, we stated that the regression model predicted that the probability of expressing a positive enlistment level was 36.3 percent for dropouts. This figure represents a weighted average of the 33.3 percent probability for the 36 college-before-accession programs and the 38.7 percent for the 12 direct enlistment programs.

It is useful to compare these results regarding direct enlistment among college dropouts with initial results from the Army's College First program. Results from the first year show a substantial market expansion effect of the College First program—specifically a 43 percent increase in enlistments among high school graduates who have completed less than one year of college (Orvis, 2001). However, among all high school graduates as well as among graduates with more than one year of college, there was no market expansion effect in the first year.⁴ Our result that direct enlistment programs are preferred to college-before-accession programs among college dropouts in our sample may seem contrary to the initial results from the Army's test. However, our sample of dropouts is comprised of individuals who have been out of high school for two years. Thus, some individuals in our dropout sample have at least one year of college, a group for which no expansion effect was found in the College First test in the first year. Further, the graduates who have less than one year of college in the College First test probably include current college students. Our analysis of the direct enlistment program purposely excluded college students, so the dropouts in our sample are not directly comparable to the graduates for whom an expansion effect was found in the test. Also notable is the study recommendation to enhance the College First program's college benefits, including higher stipend benefits. Our results indicate that such a policy would increase the enlistment propensity of college market youth, including dropouts, in college-before-accession programs like College First. As the next chapter shows, benefits for college such as the stipend and the loan repayment program are also relatively cost-effective.

⁴ According to RAND researcher Bruce Orvis, project leader of the study analyzing the College First test results, the more recent results, especially in the second and third year of the test, show a market expansion effect of the College First program relative to current programs for graduates as well as seniors (personal communication). As discussed in the text, our results are not directly comparable with the College First results for graduates because the sample compositions differ.

Estimates of the Cost-Effectiveness of Alternative College-Before-Accession Programs

The estimates in the previous section provide information on the effects of alternative policy attributes on enlistment interest in hypothetical college-before-accession recruiting programs. However, another factor to consider in weighing alternative policy attributes is the additional cost of enlisting a new recruit from the college market when each policy attribute is changed. This chapter provides rough cost estimates of the alternative programs discussed in Chapter Six. The marginal cost is defined as the added cost per new high-quality recruit that enlisted as a result of the change in a given policy attribute.

The marginal cost estimates are rough because the programs under consideration are hypothetical policies and we have information on stated enlistment intentions and not actual enlistment behavior. To estimate marginal cost, we need information on how changes in intentions translate into changes in high-quality recruits. That is, we need information on the enlistment rates among groups with different intention levels. We use estimates from past studies of enlistment rates based on past surveys of youth and young adults (described below). These studies provide only rough estimates of the enlistment rates among college market youth intention groups because they are based on the attitudes of a broad range of youth, not just college market youth, and they reflect past data and therefore historical recruiting policies and civilian opportunities.

To compute marginal cost we also need information on what fraction of enlistees take the offered policy and what fraction actually use the program among those who take the program, if it was offered to them. Past studies of the enlistment bonus program, the MGIB, the College Fund, and the LRP have shown that many individuals who enlist when a recruiting program is offered do not necessarily meet the criteria to take the program, such as entering a critical occupational area or obligating a specific term of service (Polich, Dertouzos, and Press, 1986; Fernandez, 1982). Further, those who choose a given program, and even contribute to it, do not necessarily use the maximum benefit level. In fact, one reason for the cost-effectiveness of the MGIB and College Fund is that these programs have positive enlistment effects, but relatively few individuals use the maximum benefit (Asch and Dertouzos, 1994; Hogan, et al., 2002). Unfortunately, we have little way of knowing what the actual take rate or usage rate would be of the hypothetical programs offered in the survey. Thus, we make some rough estimates and conduct some sensitivity analyses to understand how sensitive our results are to the assumed estimates.

The first part of this chapter describes in greater detail the assumptions we made to compute the rough marginal cost estimates. The second part presents the estimates and indicates the results of the sensitivity analysis.

Assumptions

To make the marginal cost estimates consistent across policy attributes, we compute the marginal cost of increasing enlistments by a set amount regardless of policy. The amount we set is equal to the effect of the loan repayment program on enlistments. Thus, we compute how much enlistments would increase under the loan repayment program and then compute the incremental cost of increasing pay, bonuses, or stipend amounts to achieve the same increase. By using the LRP as the benchmark we are able to compare the effect on cost of increasing enlistments by the same amount, regardless of policy attribute. The marginal cost estimates are computed relative to the same base case as in Table 6.2. The marginal cost of a policy change is defined as the increment in cost divided by the increment in enlistments due to that policy change. We first discuss the assumptions we make to compute the increment in enlistments, and then discuss the assumptions about the increment in costs associated with a given policy change.

Assumptions About Enlistment Rates

To compute the marginal cost of each policy, we need an estimate of how many high-quality enlistments result when a policy attribute changes. We assume that in the base case, 100 individuals are offered the college-before-accession program. As shown in Table 6.2, we predict that the probability of stating a positive propensity under the base case is 0.346 and the probability of stating a negative enlistment propensity is therefore $1 - 0.346$ or 0.654. Past research using MtF survey data found a 33.3 percent average enlistment rate among high school seniors who state a positive propensity to enlist and a 4 percent average enlistment rate among high-quality youth who state a negative propensity to enlist (Bachman, et al., 1998). When we apply these rates to the predicted probabilities of stating a positive and a negative propensity under the alternative policies, we obtain the predicted number of enlistments shown in Table 7.1, the top panel, given our assumption that 100 individuals are offered each hypothetical program. For example, we estimate that 14.14 college market youth would enlist under the hypothetical college-before-accession base case.

However, the enlistment rates by propensity level derived from the MtF survey are considerably higher than the rates found by researchers using an alternative survey, namely the YATS. The differences are likely due to differences in the composition of the samples used to compute enlistment rates. RAND studies using YATS focus on males age 16 to 21 who have been estimated to be high quality and who have not already signed an enlistment contract or entered a military program (Orvis, et al., 1996). The MtF survey includes all high school seniors, not just ones who have been estimated to be high quality. Estimates of the average enlistment rate using the MtF include both males and females. Also, the MtF survey is administered two months before high school graduation, when youth are likely to already have definite future plans. Thus, we would expect enlistment rates among those with a positive propensity to be quite high. Finally, estimates of the enlistment rate among MtF respondents expressing a positive propensity include individuals who indicated that they were already in the Delayed Entry Pool (DEP) or some other military program at the time of the survey. Thus, the MtF results seem applicable to our senior subsample. Also, since the majority of our sample is female (about 65 percent), it is important to include females when computing the average enlistment rate, especially since females have a lower enlistment rate, given they have a positive propensity to enlist. On the other hand, our sample covers individuals in the college market, a group that is likely to be high quality. Furthermore, like the analysis of the YATS, our analysis excluded individuals who are already in the military or in a military program such as ROTC or the DEP. Thus, the estimates based on the YATS also seem sensible for our purposes because they are for high-quality youth. Because neither the estimates based on the YATS nor those based on the MtF are ideal for our purposes, we use both and compare them to see how sensitive our results are to the different assumptions. As shown in Orvis, Sastry, and McDonald (1996) and by Warner, Curtis, and Payne (2001),

Table 7.1
Marginal Cost Estimates: Policy Simulations of a Change in Entry Pay, Bonus Dollars, Tuition Stipend, and Loan Repayment Offer

	Base Case	Policy Cases			
		\$65K Loan Repayment Program (25 Percent Usage Rate)	28 Percent Increase in Pay	\$35K Increase in Bonus	115 Percent Increase in Monthly Stipend
	(1)	(2)	(3)	(4)	(5)
Assume MtF Enlistment Rates, 25 percent Take Rate					
Enlistments (out of 100 offers)	14.14	18.32	18.24	18.39	18.31
Change in enlistments		4.10	4.10	4.25	4.17
Cost per person	\$112,585	\$125,659	\$136,812	\$137,289	\$133,015
Expected total change in cost		\$59,895	\$441,896	\$113,554	\$93,504
Marginal cost		\$14,305	\$107,727	\$26,728	\$22,426
Assume MtF Enlistment Rates, 75 percent Take Rate					
Total change in cost		\$179,684	\$441,896	\$340,661	\$280,512
Marginal cost		\$42,915	\$107,727	\$80,184	\$67,279
Assume YATS Enlistment Rates, 25 percent Take Rate					
Enlistments (out of 100 offers)	8.11	9.40	9.37	9.42	9.39
Change in enlistments		1.29	1.26	1.31	1.28
Expected total change in cost		\$30,724	\$227,104	\$58,172	\$47,983
Marginal cost		\$23,889	\$180,241	\$44,576	\$37,467
Assume YATS Enlistment Rates, 75 percent Take Rate					
Total change in cost		\$92,173	\$227,104	\$174,515	\$143,950
Marginal cost		\$71,668	\$180,241	\$133,728	\$112,400

the enlistment rate among males ages 17–21 years old in the YATS is 14.4 percent for those with a positive propensity. These studies find that it is 5 percent for those with a negative propensity.

Applying the MtF estimates, we estimate that under the base case, 14.14 individuals out of 100 would enlist in one of the armed services, as shown in Table 7.1. Offering the loan repayment program would yield 18.32 enlistments using the MtF enlistment rates or 4.10 additional enlistments relative to the base case in column 3. To achieve about the same number of enlistments of 18.32, pay would have to increase by 28 percent (to achieve 18.24 enlistments), the bonus would need to increase by \$35,000 (to achieve 18.39 enlistments), and the stipend would need to increase by 115 percent to about \$1,935 (to achieve 18.31 enlistments).¹

The estimated enlistment figures are lower using the YAT estimates. We estimate that the number of enlistments in the base case would be 8.11, rather than 14.14 out of 100 offers. Relative to the base case, the LRP program would produce 9.4 enlistments. Raising pay by 28 percent, increasing the bonus by \$35,000, and increasing the stipend to \$1,935 per month would produce about the same number enlistments as the LRP, as shown in the lower panel of Table 7.1.

¹ Note that in Table 6.2 the effect of the LRP on propensity is measured relative to the non-LRP case and not the base case. However, in Table 7.1, the effect of the LRP is measured relative to the base case and not the non-LRP case. The reason why we use the base case and not the non-LRP case to make our comparisons in Table 7.1 is that we needed to use the same base case to estimate the cost of a given increment in enlistments for all four policies (LRP, bonus, stipend, and pay).

Assumptions About Cost

Computing the change in cost associated with enlisting an additional college market recruit as a result of a change in a policy attribute requires several steps. First, we compute the cost of the college-before-accession program for each individual in our sample in the base case and in the policy change case. Second, we multiply the average change in cost per recruit by our estimate of the number enlistments in the policy change case. This latter calculation yields the total cost change as a result of the policy change. To compute marginal cost, the final step is to divide the total cost change by the change in the number of enlistments as a result of the policy change. Each of these steps is described in more detail in this subsection.

Step 1: Estimating the policy cost for each respondent. The first step requires several assumptions and inputs. First, some of the components of costs need to be discounted by a discount factor, to reflect the fact that expenditures in the college-before-accession programs occur in different years and the fact that a dollar paid in the future is worth less today than a dollar paid today. Enlistment bonuses, entry pay, and loan repayment benefits would not be paid until the individual entered the military after he or she completed the two or four years in college. The cost of these policies should be discounted to reflect a payout that occurs two or four years down the road. Although the college stipend is paid before individuals enter the military, stipend payments occur over the two or four-year payout period and payments in the future should be discounted as well. We discount all costs to the time at which an individual signs up for a college-before-accession contract assuming an annual interest rate of 3.5 percent. The annual discount factor is therefore $1/(1 + 0.035)$, or 0.9661. Thus, an individual who signs a contract, attends college for two years, and then enters the military would have the cost of the bonus, entry pay, and loan repayment program benefit discounted over two years to the point when he or she started the college-before-accession program.

Our discounting of future costs also recognizes that enlistment bonuses are usually paid in annual installments over the first enlistment term, if the total dollar amount exceeds some threshold. Consistent with what we told the respondents in the survey questionnaire (see Chapter Two), we assume that the enlistment term is a four-year obligation. We follow the Army's rule in FY 2001 for allocating bonus payments over the first term. We assume that bonus amounts less than \$7,000 are paid at the time of accession. Otherwise, the individual receives \$7,000 at the time of accession and the remaining amount is paid in annual installments over the remaining three years of the four-year enlistment term. Future bonus payments are discounted by the annual discount factor as well as by the probability that the individual stays in service and does not leave during the first term and forego the installment payment. We used average annual enlisted continuation rates across Department of Defense for years of service 1 to 3 for FY 2001, provided by the Defense Manpower Data Center (DMDC).²

Similarly, we also discounted the future costs of military pay over the first enlistment term, assumed to be four years, where pay is defined as regular military compensation, as before. Pay raises as a result of longevity and promotion shift up nominal military pay over the individual's entire military career. However, we only consider the future cost of a change in entry pay over the first enlistment term. Consistent with recent analysis of how enlisted pay varies over the typical military career, we assume annual nominal growth in military pay equal to 8 percent over the first term. The 8 percent figure captures historical military pay increases as well as

² The annual continuation rates for years of service 1 to 3 were 0.884, 0.906, and 0.91, respectively. We did not use the DMDC continuation rate for year of service 4 because some enlistees only have a three-year obligation, so that the continuation rate at year 4 also includes the reenlistment rate and extension rate of those with a three-year obligation. To incorporate the probability an individual stays for the fourth year, we assumed the same rate as for the third year, namely 0.91. This assumption is probably an underestimate, but should not affect our results appreciably. Thus, the assumed rates for each year of service were 0.884, 0.91, 0.91, and 0.91, respectively. Using these rates, the probability of staying in the military for four years is $0.884 \times 0.91 \times 0.91 \times 0.91$, or 0.666.

longevity and promotion raises in the first term pay that are embedded in the enlisted pay table (Asch, Hosek, and Warner, 2001). The 8 percent is an average rate and some enlisted personnel will experience faster or slower pay growth depending on such factors as their service branch, occupation, promotion speed, and duty assignments. As with the bonus, we discount future enlisted pay by an annual real discount rate of 3.5 percent and by the annual DoD-wide enlisted continuation rates for years of service 1 to 4.

In our computation of the cost of the stipend program we not only discount future stipend payments of the two or four-year college years but also account for the probability that the individual will drop or stop their schooling before completing their degree. Statistics from ACT News Releases (2002) indicate that the probability that a two-year college student will return the second year (after completing the first) is 55 percent. They also indicate that the probability of a four-year student returning after their first year is about 75 percent and that 51 percent complete their degree after five years. These figures are used to compute the expected discounted stipend payment over the two-year or four-year college program. The computation of the cost of the stipend program assumes that individuals who stop or drop before completing their college degree enter the military immediately after leaving college.

The cost estimate of the loan repayment program also requires an assumption about the average dollar amount that is used by recipients. Data provided by the U.S. Department of the Army in May 2002 indicate that recipients on average receive about \$16,250 of loan repayment funds, or 25 percent of the \$65,000 maximum available. Therefore, we assumed that on average, the loan repayment usage rate is 25 percent for those who receive this benefit.

Equation 7.1 summarizes the cost estimate we make for each observation in our sample.

$$\text{Cost}_s = \left[\text{Stipend}_s \times \sum_{i=1}^m d' \left(\frac{1}{1+r} \right)^{i-1} \right] + \left\{ \left(\frac{1}{1+r} \right)^m \times \left[\sum_{j=1}^m \left(\left(\frac{C_j}{1+r} \right)^{j-1} \times \left[\text{Pay}_s \times (1+g)^{j-1} \right] + \text{Bonus}_{js} \right) \right] + (\$65,000 \times k) \right\} \quad (7.1)$$

In this equation, i is the school year, m is the number of years over which college tuition stipend benefits are paid (two or four), r is the real discount rate (assumed to be 3.5 percent), j is the year of service, d'_i is the probability the individual stays in college and returns in the following year, C_j is the probability an individual stays until year j , g is the annual growth rate in pay (assumed to equal 8 percent), and k is the fraction of the loan repayment benefit used by an individual if he or she is offered the benefit. The variable Stipend_s in Equation 7.1 is the monthly stipend dollar amount that is multiplied by 9 to compute the annual stipend assuming a nine-month academic year. The variable Pay_s is equal to the dollar value of entry pay, and the variable Bonus_{js} is the bonus payment in year of service j . The subscript s in Equation 7.1 represents the case under consideration, the base case or one of the policy simulation cases. In the base case, the values of variables $\text{Stipend}_{\text{base}}$, Pay_{base} , and $\text{Bonus}_{\text{base}}$ in Equation 7.1 are the actual values of these variables for each observation in our sample. In the policy simulation cases, the values of variables reflect the policy change. For example, when we simulate the effect of a 28 percent increase in entry pay, $\text{Pay}_{\text{pay}} = \text{Pay}_{\text{base}} (1 + 0.28)$ for each observation in the sample. The weighted average of the costs per person of each policy are shown in Table 7.1. Thus the estimate of the cost per person in the base case is \$112,585 and in the case of the pay raise is \$136,812.³

³ One factor we ignore in our cost computations is the individual's repayment of bonuses, stipend benefits, and loan repayments to the DoD if the individual fails to complete his or her first term. The survey informed respondents that they would have to repay the prorated value of these benefits if they failed to complete their service obligation. Thus, there is a potential savings associated with repayments. On the other hand, tracking down and successfully getting repayments also involves some cost. Ignoring the repayment issue may cause us to somewhat underestimate or overestimate the marginal costs of bonuses, stipends, and LRP relative to pay. However, this bias is of practical importance because we find that the marginal cost of pay is so much higher than the marginal costs of the other benefits, as shown below.

To compute the change in cost per person as a result of a policy change, we compute the difference in the cost of the policy relative to the base case. Thus, in the case of pay, we compute, $\text{Cost}_{\text{pay}} - \text{Cost}_{\text{base}}$. The weighted average of these cost changes across the observations in our data represent our estimate of the per person increment in cost due to the policy change. Thus, the estimated increment in per person cost of a 28 percent increase in pay is \$24,227 (not shown in Table 7.1).

Step 2: Computing the expected total change in policy cost. The next step is to compute the expected total change in cost as a result of each policy change. Total cost change is defined as the change in cost per person of the policy multiplied by the number of enlistments under the new policy multiplied by the fraction of enlistments that actually take the program. In the case of the LRP, the cost per person of this policy is \$125,659 (in conjunction with the other program attributes) while the estimated number of enlistments under this policy is 18.32 using the MtF estimates and 9.4 using the YATS estimates. Therefore, the total cost change is \$239,580 in the MtF case, equal to $(\$125,659 - \$112,585) \times 18.32$, and \$122,896 in the YATS case, equal to $\$125,659 - \$112,585 \times 9.4$.

To compute the expected total cost change under each policy, we also must make an assumption about the fraction of new enlistments that actually take the program offered (i.e., the take rate). Evidence from enlisted supply studies suggests that individuals who enlist in response to an expansion of a given recruiting policy do not necessarily take that specific policy. For example, in the Enlistment Bonus Test, many of the additional recruits who enlisted as a result of the expansion of the enlistment bonus program chose occupations in which they were not eligible for the expanded bonus (Polich, Dertouzos, and Press, 1986). It is not clear what fraction of additional enlistments generated by the policy changes in Table 7.1 would choose to take the policy. We consider two cases. In the first case, we assume that 25 percent of enlistments actually take the program offered, and in the second case, we assume a 75 percent take rate. Of course, in the case of increases in pay, everyone receives that benefit, so in the case of the 28 percent pay increase, we assume that 100 percent of the enlistments take that benefit. Given these alternative assumptions, Table 7.1 shows our estimate of the expected total cost change under each policy including the base case. Accounting for a 25 percent take rate, the expected total cost change for the LRP program using the MtF enlistment rates is \$59,895 (equal to $\$239,580 \times 0.25$) and is \$30,724 (equal to $\$122,896 \times 0.25$) using the YATS rates, shown in Table 7.1.

Marginal Cost Estimates

Marginal cost is computed as the expected total cost change divided by the change in enlistments as a result of the policy. In the case of LRP, the marginal cost estimate is \$14,305 using the MtF estimates and is \$23,889 using the YATS estimates and assuming a 25 percent take rate.⁴ Because of our uncertainty about what fraction of individuals expressing a given level of propensity actually enlist and what fraction of enlistments will take the college-before-accession option, we present in Table 7.1 the marginal cost estimates using both the MtF enlistment rate and the lower YATS enlistment rate and use a high take rate assumption of 75 percent and a lower rate of 25 percent.

⁴ It is important to note that our marginal cost estimates are not directly comparable to past estimates of the marginal recruiting cost of different recruiting resources. Past studies such as Warner, Simon, and Payne (2001) and Dertouzos and Garber (2003) estimate the marginal cost associated with different recruiting policies of signing up a high-quality high school senior or graduate for a traditional enlistment contract that would not necessarily provide a college benefit. Our estimates reflect the marginal cost of signing up a college market youth for a nontraditional enlistment contract that would involve college before accession. Because of these differences our marginal cost estimates differ structurally from previous estimates. For example, our estimate for pay is substantially higher than the Warner, Simon, and Payne (2001) estimates of between \$30,000 and \$59,000 for each additional recruit because our estimate represents the increment in the expected present discounted value of pay over the first enlistment term, not just the first year of service, it incorporates pay growth over the first term, and it includes the college tuition benefit and bonus payments associated with the college-before-enlistment option of the base case. It should also be noted that the focus of our effort is to compare the relative sizes of the marginal costs of alternative policies, not to determine their absolute magnitudes, as the text discusses shortly.

Because of our uncertainty about certain assumptions, we have relatively little confidence in the actual marginal cost estimates. However, the results in Table 7.1 show that regardless of whether we use the MtF or the YATS enlistment rates or assume a 25 percent or 75 percent take rate, the loan repayment program has the lowest estimated marginal cost. Thus, given our assumptions, the loan repayment is the most cost-effective way relative to pay, bonuses, or stipend benefits to achieve a given increment in enlistments. Using the MtF enlistment rates we find that the marginal cost of the LRP is \$14,305 while the marginal cost of pay is \$107,727. The estimated marginal costs of the bonus and stipend benefits are similar: \$26,728 and \$22,426, respectively, using the MtF rates. Pay is significantly more expensive than the other policies because pay cannot be targeted and any pay raises must be given to all recruits, not just those taking the college-before-accession program.

One reason for the relatively lower cost of the loan repayment program is that those who take the program are assumed to use only about \$16,000, or 25 percent, of the \$65,000, according to recent Army usage rates of this program. On the other hand, the effect on enlistment interest is large, suggesting that college market youth are highly attracted to the idea of a \$65,000 benefit. These factors suggest that there is a strong difference between what individuals perceive is the value of the benefit and the cost of the benefit to the military. If takers were to use a larger fraction of the loan repayment benefit, the cost of the program would increase, to the point of making the program less cost-effective than other policy attributes. When we conduct sensitivity analysis and set the LRP benefit usage rate to 75 percent instead of 25 percent, the marginal cost of the LRP is \$42,913 (assuming the MtF enlistment rates and a 25 percent college-before-accession take rate). In this case, the LRP is less cost-effective than either the enlistment bonus or stipend benefit, and only more cost-effective than raising pay, as shown in Table 7.2. When usage rates are high, the bonus and stipend policy attributes are more cost-effective than the LRP.

On the other hand, the Army's average usage of \$16,000 includes individuals who attended college at both two- and four-year institutions. Given the substantially lower cost of two-year colleges, the average usage for two-year college attendees is likely to be substantially less than the \$16,000 figure while the average use for four-year attendees is likely to be more. When we assume that those who get the LRP benefit only use 10 percent of the \$65,000 benefit, the cost-effectiveness of the loan repayment program is even greater than the figures in Table 7.1 indicate, as shown in Table 7.2. Specifically, the marginal cost of the LRP is only \$5,722 while the marginal cost of the stipend (the next lowest in terms of marginal cost) is \$22,426.⁵

We also conducted sensitivity analysis to determine whether the results in Table 7.1 are sensitive to the discount rate assumption of 3.5 percent. We recomputed the marginal cost figures assuming a lower real rate of 1.5 percent and a higher real rate of 5.5 percent. With a 1.5 percent discount rate assumption, we find that the marginal cost figures are uniformly higher, but the relative comparisons remain the same. For example, using the MtF enlistment rates and a take rate assumption of 25 percent (as in the top panel of Table 7.1), the marginal cost of pay, bonus dollars, stipend benefits, and the LRP is estimated to be \$117,327, \$29,228, \$22,846, and \$15,179, respectively. Thus, pay continues to be the least cost-effective policy attribute while the LRP continues to be the most cost-effective. Not surprisingly, the marginal cost of the stipend changes the least when we assume a lower discount rate while the marginal cost of pay and bonuses change the most. Since all dollars discounted are paid at the time the individual signs a college-before-accession contract, college stipend benefits are discounted for fewer years than are bonus dollars and military pay. We also find that the relative cost-effectiveness of the policy attributes stay the same when we use a higher assumed discount rate of 5.5 percent. As before, the loan repayment program is the most cost-effective and pay is the least cost-effective policy, while the marginal cost figures are uniformly lower when the discount rate is higher. Specifi-

⁵ The figures in Table 7.2 are probably upper and lower bounds of the marginal costs of the LRP under different assumptions about the usage rate. Although we vary the usage rate in Table 7.2, we do not vary the enlistment effect. In reality, two-year college attendees are likely to have a weaker enlistment effect of the LRP than 4-year attendees because they know that they will use less of the benefit. Similarly, 4-year college attendees are likely to have a stronger enlistment effect because they know they will use more of the LRP benefit.

Table 7.2
Marginal Cost Estimates of the Loan Repayment Offer Assuming Alternative Usage Rates (Assuming MtF Enlistment Rates and a 25 Percent Take Rate)

	Enlistments (1)	Change in Enlistments (2)	Cost Per Person (3)	Total Change in Cost (4)	Marginal Cost (5)
Assume LRP Usage Rate of 75 Percent					
Base Case	14.14		\$115,825		
\$65K LRP	18.32	4.19	\$155,045	\$179,674	\$42,913
28 percent Pay Increase	18.24	4.10	\$140,051	\$441,877	\$107,772
\$35K Bonus Increase	18.39	4.25	\$140,525	\$113,554	\$26,728
115 percent Stipend Increase	18.31	4.17	\$136,255	\$93,504	\$22,426
Assume LRP Usage Rate of 10 Percent					
Base Case	14.14		\$111,613		
\$65K LRP	18.32	4.19	\$116,843	\$23,960	\$5,722
28 percent Pay Increase	18.24	4.10	\$135,840	\$441,896	\$107,727
\$35K Bonus Increase	18.39	4.25	\$136,318	\$113,558	\$26,729
115 percent Stipend Increase	18.31	4.17	\$132,043	\$93,504	\$22,426

cally, using the MtF enlistment rates and a take rate assumption of 25 percent (as in the top panel of Table 7.1), the marginal costs of pay, bonus dollars, stipend benefits, and the LRP are estimated to be \$99,305, \$24,541, \$22,039, and \$13,515, respectively.

The figures in Table 7.1 focus on the dollar costs of alternative policies that enhance the college-before-accession incentive. In contrast to raising pay, bonus dollars, stipend benefits, or offering an LRP, requiring individuals to major in a particular academic area while in college has the potential to offer cost savings. If the college major of enlistees provides individuals with training and education that these individuals would have received during their military training, requirements concerning enlistees' college major could save training costs. On the other hand, the results in Chapter Seven showed that such a requirement would also reduce the probability of expressing a positive interest in a college-before-accession contract. A relevant policy question is the degree to which the training cost savings offset the reduced enlistment interest, when compared to other policies, such as higher pay or stipend benefits.

Table 7.3 provides a rough answer to this question. Assuming an average training course cost of occupation-related training of \$8,725, the total cost savings of the college major requirement, relative to the base case, is \$28,889, using the MtF enlistment rates and assuming a 25 percent take rate.⁶ The cost savings is estimated to be only \$17,101 using the YATS enlistment rates. After accounting for the decline in enlistments we estimate that the marginal cost savings of requiring a vocational college major is \$16,482 using the MtF rates and \$31,763 using the YATS rates. Or, viewed in the opposite direction, the marginal cost of eliminating the requirement is \$16,482 or \$31,763, respectively. We can compare the cost-savings of the college major requirement with the marginal cost of restoring enlistments using pay, bonuses, or stipend benefits. For enlistments to offset the reduction caused by the requirement regarding college major, either the pay would need to rise by 7 percent, the bonus would need to double, or the stipend would need to rise by about 25 percent. Using the MtF enlistment rates (and assuming a 25 percent take rate) we estimate that the marginal cost of these changes would be about \$86,000 for the pay change, \$16,932 for the bonus change, and \$17,832 for the stipend change. Thus, a requirement regarding college major would produce a cost-savings of around \$16,486

⁶ The \$8,725 figure is the average course cost of Army advanced individual training, after basic training, obtained from Appendix D of Orvis et al. (1996) and adjusted for inflation to put the figure in 2001 dollars. The figure includes direct costs such as school staff pay and allowances as well as indirect costs such as installation support operations and maintenance.

Table 7.3
Marginal Cost Savings Estimates of College Major Requirement

Policy Attribute	Base Case	Policy Cases
	(1)	College Major Requirement (2)
Assume MtF Enlistment Rates, 25 percent Take Rate		
Enlistments (out of 100 offers)	14.14	13.24
Change in enlistments		-0.90
Cost savings per person		\$8,726
Total change in cost		\$28,889
Marginal cost savings		\$16,482
Assume YATS Enlistment Rates, 25 percent Take Rate		
Enlistments (out of 100 offers)	8.11	7.84
Change in enlistments		-0.28
Cost savings per person		\$8,726
Total change in cost		\$17,101
Marginal cost savings		\$31,763

Note: The assumed average training cost of \$8,726 is derived from average cost estimates of Army advanced individual training (Orvis, et al., 1996) and applying an adjustment for inflation to put the training cost figure in 2001 dollars.

due to lower training costs but would also reduce enlistments. Offering a larger bonus or stipend benefit as part of a college-before-accession program would offset the decline in enlistments and the marginal cost of the higher bonus or stipend would be about \$17,000. Thus the marginal cost of increasing the stipend or bonus to improve enlistments would offset the cost-savings and negative enlistment effect of the college major requirement.

It is important to recognize that the figures in Table 7.2 depend on the assumption of an average training cost of \$8,725. To the extent that trainings costs are significantly higher or lower or the extent that college training is or is not a good substitute for military training, the results could be quite different from those shown in the table. Furthermore, as noted in Chapter Five, our results concerning the effects of a requirement that individuals major in an area pertain to universally imposing such a requirement on all college-before-accession contracts, not to programs, such as the Navy tech-prep program that targets a specific population, such as hospital corpsmen. By targeting a small and specific population, the services may realize a training cost savings without a negative effect on enlistments.

Conclusions and Policy Implications

A key finding of our study is that the LRP is the most cost-effective policy attribute of those we considered within the context of the college-before-enlistment programs. This result was found regardless of whether we assumed a high or low enlistment rate among those stating a positive propensity to join the military, alternative discount rates, or benefit take rates. The only exception to this conclusion is when we made an alternative assumption about the amount of the dollar loan repayment benefit recipients actually used. In most of our computations we assumed that LRP recipients used only 25 percent, or about \$16,000, of the LRP benefit. This figure was based on actual Army LRP usage rates in FY 2000.

The reason the LRP was found to be so cost-effective was that enlistment interest among the survey's college market youth was highly responsive to the \$65,000 dollar benefit, yet the cost of the benefit was fairly modest because we assumed they used only \$16,000 of the benefit. It is possible that individuals responding to the LRP option in the survey did not fully comprehend that the benefit would only pay for federal loan debt—not any college debt—despite the fact that the survey question explicitly stated “federal student loans.” Also, the maximum benefit of \$65,000 under the LRP is larger than all of the college stipend options that we included in the survey.

The difference between perception of the dollar value of the benefit and the actual usage is reminiscent of the existing College Fund program in the Army, Navy, and Marine Corps. Unlike the college-before-enlistment programs considered in this study, the College Fund offers college benefits to enlistees after (not before) they have completed their service obligation. The College Fund has traditionally been viewed as a cost-effective market expander because enlistments expanded when the College Fund was increased but the actuarial cost of the program was modest because of the relatively low usage of the benefit. One important difference between the College Fund and the college-before-accession programs is that the LRP would be paid out at the time of accession, which increases the discounted present value of cost. When we assumed a substantially larger usage rate, equal to 75 percent rather than 25 percent, the LRP was no longer found to be more cost-effective than bonuses and stipend benefits. Thus, at current usage rates, our study suggests that the LRP is a cost-effective tool to expand college market enlistments, but not at high rates.

That the LRP approach has such a large relative effect on stated propensity is somewhat surprising. The fraction of high-quality recruits enlisting with the LRP has historically been quite small, only around 3.3 percent of high-quality Army enlistees in FY 1998.¹ The low percentage reflects the low percentage of recruits with

¹ The figure is based on analysis by John Warner at Clemson University using the Army's recruiting master file, provided in private communication with the authors (2000).

sizable federal student loan debt, the traditional allocation of recruiter effort towards youth in the high schools and not toward those with some college, and the small level of resources devoted to the LRP in past years. For example, the Army budget for the LRP rose from \$22.9 million to \$30.2 million in FY 2000, according to budget figures provided by the Office of Accession Policy within the Office of the Secretary of Defense (2003). Yet, the LRP budget was substantially smaller in FY 2000 than was either the Army's enlistment bonus budget (\$108.1 million), the College Fund budget (\$104.9 million), or the advertising budget (\$240 million).

Thus, a key policy implication of our study is that the growth in the Army's LRP budget in recent years is quite sensible. As recruiters devote more effort to the college market and the program becomes better funded and more easily available, the survey results indicate that youth will find this option relatively attractive.

Not surprisingly, we also found that pay, bonuses, and college stipend benefits positively affect youths' attitudes toward college-before-enlistment programs. These results suggest that recent improvements in military pay will increase the attractiveness of the military to college market youth, including the college-before-accession option. They also suggest that the increases in the stipend benefits in the Army's test program, College First, from \$150 per month before FY 2002 to \$250 to \$350 per month beginning in FY 2002 will have a positive, although modest, effect. Furthermore, given our result that males are more responsive to pay, bonuses, and stipend benefits, the recent improvements in pay and stipend benefits will be particularly effective for males, the traditional target recruiting market.

Our study also found that requirements that narrow the individual's choice of college major or military career field had a negative effect on average on the probability of expressing a positive enlistment interest. A policy implication of this finding is that broad application of such requirements across the college market will be met with less enlistment interest. The negative effect of military career field requirements was particularly large for the college dropout group. It may be the case that this group has a clearer understanding of the implications of this requirement since they are more likely to be employed and are therefore more attached to their working conditions. This result suggests that college-before-accession programs that channel individuals into specific military career fields will have more limited success with college dropouts than other college market youth.

Several of the participants in the pretest discussion who were dropouts indicated that they would like to return to college someday. Furthermore, 81.2 percent of the dropout survey respondents said they would like to attend college part-time or full-time in the future (Table 5.2). Nonetheless, we estimated that programs that allowed dropouts to enlist directly without first returning to college were associated with a stronger stated enlistment interest level. Although the effect of the individual attributes of the direct-enlistment programs were not statistically significant at the conventional levels (except for the variable representing the career field requirement), the variables were jointly significant at the 5 percent level.

At first blush, these results seem to run counter to the first-year results of the Army's College First test. In the first year, the College First program expanded enlistments among individuals with less than a year of college by 43 percent. This group included current college students as well as recent college dropouts. However, among all high school graduates as well as among graduates with more than one year of college, there was no market expansion effect in the first year, although more recent results indicate a market expansion of this group as well. Our sample of dropouts is comprised of individuals who have been out of high school for two years. Furthermore, we did not examine how college students respond to direct enlistment programs, so our sample of dropouts is not directly comparable to the graduates for whom an expansion effect was found in the test. Our analysis indicates that current efforts by the services to actively recruit dropouts to enlist in current direct enlistment programs are appropriate. Indeed, 20 percent of Army accessions now have some college, a testament to the Army efforts to expand recruiting in the college market. The Army hopes to increase this percentage in the future.

Finally, the analysis in this report is based on survey responses that come directly from potential recruits. It therefore sidesteps entirely an issue that has been raised and analyzed in past studies: the issue of recruiter

effort. Past studies have shown that the quantity and quality of enlistments depends not only on the number of recruiters but also how they choose to allocate their effort toward the enlistment of high-quality rather than low-quality recruits (Dertouzos, 1985). Thus, for any program that targets the enlistment of college market youth to be successful, such as those discussed in this report, the services will need to ensure that recruiters are motivated and able to successfully reach these types of youth. Doing so requires a management infrastructure. For example, the recruiters' incentive plan will need to explicitly reward the recruitment of college market youth. Recruiters will need to get credit under those incentive plans for college recruitment, even if those new recruits are in the DEP for long periods of time. The services will need to establish and maintain an advertising campaign that supports the recruiters' efforts on college campuses, and they will need to provide those recruiters with the resources and training that will help them succeed. Without this infrastructure, no recruiting program is likely to meet its potential.

Copy of Survey Instrument

Chapter Two described the survey questionnaire in detail. The survey had four questionnaires that were identical except for the specific hypothetical policy programs included in the survey instrument. The specific programs and their assignment to the four different questionnaires are shown in Table 2.7. This appendix provides a copy of the first version of the survey instrument. The other versions can be derived by replacing the hypothetical programs in this copy with the attributes listed in Table 2.7. It should be noted that the copy below is not exact. The formatting of this copy differs from the one shown to the survey participants because the Web-based version of the survey split up the questions across many screens, for ease of electronic loading. The mail version printed the survey like a brochure, with two columns of text per page. We mailed it as a brochure to save on postage costs.

As seen in Section Three of the survey instrument, the survey asks the respondents to rate their likelihood of enlisting under each program on a scale of 1 (definitely likely) to 7 (definitely not likely). In Chapter Four, we stated that we conducted the analysis with the reverse scale where 1 is “definitely not likely” and 7 was “definitely likely.” The reason for the switch between the relative rankings in the survey versus the analysis is that it was easier to interpret the regression coefficients in the analysis when a higher ranking represented a more positive attitude toward enlistment.

Survey of Youth in the College Market

If you have any questions about this survey, please call:

R at 1-XXX-XXX-XXXX

Please return your completed questionnaire in the enclosed envelope to:

R

Survey Research Group
Attn: **Norman Mundy – SRG-1**
1700 Main Street
PO Box 2138
Santa Monica, CA 90407-2138

Sponsored by the Department of Defense

2001

Background Information on the Survey

This study is sponsored by the Department of Defense and is authorized in 10 U.S. Code 2358, Research Projects. Any information you provide is protected under the Privacy Act of 1974. Your identity will not be released except as required by law and only aggregate statistics will be reported. Your response is voluntary; you may skip questions that you prefer not to answer for any reason.

The survey takes about 20 to 25 minutes to complete.

SURVEY INSTRUCTIONS

Answer the questions by checking the box to the left of your answer. Please follow the directions provided for each question.

The first three questions (1.1–1.3) determine whether you are eligible to participate in this study. Follow the instructions on those questions carefully. **Please return the survey to us even if you are NOT eligible for this survey.**

You are sometimes told to skip over some questions in this survey. When this happens, you will see an arrow with a note that tells you what question to answer next, like this:

- ☒ Yes → **Go to Question 10**
☐ No

All information that would let someone identify you will be kept confidential. You may notice a bar code on the cover of this survey. This code is **ONLY** used to let us know that you returned the survey so we don't have to send you reminders. If you want to know more about this survey, please call 1-XXX-XXX-XXXX.

These first questions determine your eligibility to participate in this study. Please follow the instructions on these questions carefully. Return the survey to us with the enclosed, postage-paid envelope even if you find yourself NOT eligible for this study.

1.1 Are you currently between 17 and 21 years old?

(Check One)

- 1 ☐ Yes
2 ☐ No → **Stop and return the survey**

1.2 Which category best describes your current educational background and future plans?

(Check One)

- 1 ☐ Currently a senior in regular, full-time high school and plan to attend college within a few months of graduation
2 ☐ Currently a college student
3 ☐ College graduate → **Stop and return the survey**
4 ☐ Disenrolled college student (have some college credits, but not a degree, and am not in college now)
0 ☐ None of the above → **Stop and return the survey**

1.3 Have you ever been in the military or are you in a delayed entry program (DEP), college ROTC, junior ROTC, or one of the service academies?

(Check One)

- 1 ☐ Yes → **Stop and return the survey**
2 ☐ No

FUTURE PLANS

This section of the survey asks about what you plan to do in the next few years. If you are currently in high school, please consider your plans after you finish high school.

2.1 Taking everything into consideration, what do you think you might be doing in the next few years?

(Check All That Apply)

- ☐ ₁ Going to college full-time
- ☐ ₂ Going to college part-time

- ☐ ₃ Going to a vocational, business, or trade school
- ☐ ₄ Working full-time
- ☐ ₅ Working part-time
- ☐ ₆ Serving in the active military

- ☐ ₇ Serving in the Reserve or National Guard
- ☐ ₈ Staying at home or having a family
- ☐ ₉ Doing nothing
- ☐ ₀ None of the above

2.2 What is the highest level of education you expect to complete?*(Check One)*

- 1 ☐ 12 years of school, no diploma
- 2 ☐ High school diploma or the equivalent (e.g., GED) not from home schooling
- 3 ☐ High school diploma or the equivalent (e.g., GED) from home schooling
- 4 ☐ Some college credit, but less than one year
- 5 ☐ One or more years of college, but no degree
- 6 ☐ Associate's degree (e.g., AA, AS)
- 7 ☐ Bachelor's degree (e.g., BA, AB, BS)
- 8 ☐ Master's degree (e.g., MA, MS)
- 9 ☐ Doctoral or professional degree (e.g., PhD, MD, JD)

2.3 If you were to continue your education, what would be the main reasons?*(Check All That Apply)*

- 1 ☐ Need college to get a better job/ career in the future
- 2 ☐ Family wants me to go
- 3 ☐ Can't find a job
- 4 ☐ Want to learn more
- 5 ☐ Want to be away from home
- 6 ☐ Want to have the college experience
- 7 ☐ Nothing better to do
- 0 ☐ None of the above

2.4 If you were NOT going to continue your education, what would be the main reasons?*(Check All That Apply)*

- 1 ☐ Don't have the money or resources
- 2 ☐ Need to work because of family obligations
- 3 ☐ Tired of going to school
- 4 ☐ Grades aren't good enough for college
- 5 ☐ Takes too long to get a degree
- 6 ☐ Family doesn't want me to go
- 7 ☐ Other reason (*please specify*) _____

2.5 How likely is it that you will be serving in the military in the next few years?*(Check One)*

- 1 ☐ Definitely likely
- 2 ☐ Probably likely

- 3 ☐ Probably not likely
 4 ☐ Definitely not likely

2.6 If you were to join the military, which branches would you most likely consider?

(Check All That Apply)

- 1 ☐ Air Force
 2 ☐ Army
 3 ☐ Coast Guard
 4 ☐ Marine Corps
 5 ☐ Navy

2.7 Which type of service would that be?

(Check One)

- 1 ☐ Active duty (i.e., full-time)
 2 ☐ Reserve or National Guard (i.e., part-time)
 3 ☐ Either
 4 ☐ Not sure

2.8 If you were to consider joining the military, what would be the main reasons?

(Check All That Apply)

- 01 ☐ Get away from family, personal situation, or hometown
 02 ☐ Time to figure out what you wanted to do
 03 ☐ Test yourself physically or mentally
 04 ☐ Challenging or interesting work
 05 ☐ Always wanted to be in the military
 06 ☐ Military tradition in your family
 07 ☐ Desire to serve your country
 08 ☐ Few or no civilian job opportunities
 09 ☐ Pay and allowance(s)
 10 ☐ Retirement pay and benefits
 11 ☐ Security and stability of the job
 12 ☐ Training in skills useful for civilian employment
 13 ☐ Travel and new experiences
 14 ☐ Money for college, college repayment, and education benefits and opportunities
 15 ☐ Personal growth and maturity
 00 ☐ None of the above

2.9 What would be the main reasons you might NOT consider joining the military?

(Check All That Apply)

- 01 ☐ Pay/ money
 02 ☐ Interferes with my educational plans
 03 ☐ Family obligations
 04 ☐ Health/ medical limitations
 05 ☐ Against my beliefs/ conscientious objector/ opposed to killing
 06 ☐ Don't like military lifestyle
 07 ☐ Threat to my life
 08 ☐ Not qualified to serve
 09 ☐ Other career interests
 10 ☐ Commitment is too long
 11 ☐ Negative publicity
 12 ☐ Other reason (*please specify*) _____

COLLEGE AND MILITARY ENLISTMENT OPPORTUNITIES

We'd like your opinion on nine new programs that the military might offer in the future, even if you don't plan to enter the military in the next few years. Their purpose is to interest people like yourself in military service by offering them the opportunity to obtain a college degree before enlisting in the military. For those who are disenrolled from college, it would offer an opportunity to return to college and obtain a degree before enlisting.

Each program includes the following:

- a scholarship benefit to help pay for college
- for those completing two years of college, a higher starting military salary than what is currently offered to those enlisting without any college

The programs differ in the level and type of college benefit, starting military salary and entry bonus levels, required college major, and military career field.

Each program would require the following:

- full-time enrollment and a minimum C GPA while in college
- completion of at least two years of college
- military enlistment within three months of finishing school

- completion of four years of active military service

Those who don't meet the requirements would have to repay the scholarship benefit and entry bonus if one is received.

PROGRAM 1:**College scholarship benefit:**

You would receive a stipend of **\$600** per month that would be paid for **two** academic years.

College major:

You would be required to follow a course of study that was more **vocational** than academic (examples would include computers, engineering, health, electronics, mechanics, and business).

Military entry pay:

Your starting annual salary would be **\$25,000**, and you would get a **\$5,000 entry bonus**.

Military career field:

After you enter the military, you would be required to enter an occupation in a **technical field** (such as computers, engineering, electronics, aviation, health, or mechanics), but you would have a choice of occupation within that field.

3.1 On a scale of 1 to 7, where 1 means "Definitely Likely" and 7 means "Definitely Not Likely," how likely is it that you would serve on active duty in the military if you were offered Program 1?

(Check One)

- | | | |
|--------------------------|---|-----------------------|
| <input type="checkbox"/> | 1 | Definitely likely |
| <input type="checkbox"/> | 2 | Probably likely |
| <input type="checkbox"/> | 3 | Somewhat likely |
| <input type="checkbox"/> | 4 | Not sure |
| <input type="checkbox"/> | 5 | Somewhat not likely |
| <input type="checkbox"/> | 6 | Probably not likely |
| <input type="checkbox"/> | 7 | Definitely not likely |

PROGRAM 2:

College scholarship benefit:

You would receive a stipend of **\$900** per month that would be paid for **four** academic years.

College major:

You would be required to follow a course of study that was more **vocational** than academic (examples would include computers, engineering, health, electronics, mechanics, and business).

Military entry pay:

Your starting annual salary would be **\$26,000**.

Military career field:

After you enter the military, you would **not be required** to enter a particular career field. You would have your choice of occupation among those for which you are qualified.

3.2 On a scale of 1 to 7, where 1 means "Definitely Likely" and 7 means "Definitely Not Likely," how likely is it that you would serve on active duty in the military if you were offered Program 2?

(Check One)

- | | | |
|--------------------------|---|-----------------------|
| <input type="checkbox"/> | 1 | Definitely likely |
| <input type="checkbox"/> | 2 | Probably likely |
| <input type="checkbox"/> | 3 | Somewhat likely |
| <input type="checkbox"/> | 4 | Not sure |
| <input type="checkbox"/> | 5 | Somewhat not likely |
| <input type="checkbox"/> | 6 | Probably not likely |
| <input type="checkbox"/> | 7 | Definitely not likely |

PROGRAM 3:**College scholarship benefit:**

You would receive a stipend of **\$1,400** per month that would be paid for **two** academic years.

College major:

You would **not be required** to follow a particular course of study, although you would be required to be seeking a college degree (such as AA, AS, AB, BA, or BS degrees).

Military entry pay:

Your starting annual salary would be **\$25,000**, and you would get a **\$15,000 entry bonus**.

Military career field:

After you enter the military, you would **not be required** to enter a particular career field. You would have your choice of occupation among those for which you are qualified.

3.3 On a scale of 1 to 7, where 1 means "Definitely Likely" and 7 means "Definitely Not Likely," how likely is it that you would serve on active duty in the military if you were offered Program 3?

(Check One)

- ☐ 1 Definitely likely
- ☐ 2 Probably likely
- ☐ 3 Somewhat likely
- ☐ 4 Not sure
- ☐ 5 Somewhat not likely
- ☐ 6 Probably not likely
- ☐ 7 Definitely not likely

PROGRAM 4:

College scholarship benefit:

You would receive a stipend of **\$150** per month that would be paid for **two** academic years. In addition, any federal student loans that you or your parents/guardians obtained, up to **\$65,000**, would be paid off.

College major:

You would **not be required** to follow a particular course of study, although you would be required to be seeking a college degree (such as AA, AS, AB, BA, or BS degrees).

Military entry pay:

Your starting annual salary would be **\$25,000**, and you would get a **\$35,000** entry bonus.

Military career field:

After you enter the military, you would **not be required** to enter a particular career field. You would have your choice of occupation among those for which you are qualified.

3.4 On a scale of 1 to 7, where 1 means "Definitely Likely" and 7 means "Definitely Not Likely," how likely is it that you would serve on active duty in the military if you were offered Program 4?

(Check One)

- | | | |
|--------------------------|---|-----------------------|
| <input type="checkbox"/> | 1 | Definitely likely |
| <input type="checkbox"/> | 2 | Probably likely |
| <input type="checkbox"/> | 3 | Somewhat likely |
| <input type="checkbox"/> | 4 | Not sure |
| <input type="checkbox"/> | 5 | Somewhat not likely |
| <input type="checkbox"/> | 6 | Probably not likely |
| <input type="checkbox"/> | 7 | Definitely not likely |

PROGRAM 5:**College scholarship benefit:**

You would receive a stipend of **\$900** per month that would be paid for **two** academic years.

College major:

You would **not be required** to follow a particular course of study, although you would be required to be seeking a college degree (such as AA, AS, AB, BA, or BS degrees).

Military entry pay:

Your starting annual salary would be **\$25,000**, and you would get a **\$25,000 entry bonus**.

Military career field:

After you enter the military, you would be required to enter an occupation in a **technical field** (such as computers, engineering, electronics, aviation, health, or mechanics), but you would have a choice of occupation within that field.

3.5 On a scale of 1 to 7, where 1 means "Definitely Likely" and 7 means "Definitely Not Likely," how likely is it that you would serve on active duty in the military if you were offered Program 5?

(Check One)

- | | | |
|--------------------------|---|-----------------------|
| <input type="checkbox"/> | 1 | Definitely likely |
| <input type="checkbox"/> | 2 | Probably likely |
| <input type="checkbox"/> | 3 | Somewhat likely |
| <input type="checkbox"/> | 4 | Not sure |
| <input type="checkbox"/> | 5 | Somewhat not likely |
| <input type="checkbox"/> | 6 | Probably not likely |
| <input type="checkbox"/> | 7 | Definitely not likely |

PROGRAM 6:

College scholarship benefit:

You would receive a stipend of **\$600** per month that would be paid for **four** academic years.

College major:

You would be required to follow a course of study that was more **vocational** than academic (examples would include computers, engineering, health, electronics, mechanics, and business).

Military entry pay:

Your starting annual salary would be **\$29,000**.

Military career field:

After you enter the military, you would be required to enter an occupation in a **technical field** (such as computers, engineering, electronics, aviation, health, or mechanics), but you would have a choice of occupation within that field.

3.6 On a scale of 1 to 7, where 1 means "Definitely Likely" and 7 means "Definitely Not Likely," how likely is it that you would serve on active duty in the military if you were offered Program 6?

(Check One)

- | | | |
|--------------------------|---|-----------------------|
| <input type="checkbox"/> | 1 | Definitely likely |
| <input type="checkbox"/> | 2 | Probably likely |
| <input type="checkbox"/> | 3 | Somewhat likely |
| <input type="checkbox"/> | 4 | Not sure |
| <input type="checkbox"/> | 5 | Somewhat not likely |
| <input type="checkbox"/> | 6 | Probably not likely |
| <input type="checkbox"/> | 7 | Definitely not likely |

PROGRAM 7:**College scholarship benefit:**

You would receive a stipend of **\$1,200** per month that would be paid for **two** academic years.

College major:

You would **not be required** to follow a particular course of study, although you would be required to be seeking a college degree (such as AA, AS, AB, BA, or BS degrees).

Military entry pay:

Your starting annual salary would be **\$28,000**.

Military career field:

After you enter the military, you would be required to enter an occupation in a **technical field** (such as computers, engineering, electronics, aviation, health, or mechanics), but you would have a choice of occupation within that field.

3.7 On a scale of 1 to 7, where 1 means "Definitely Likely" and 7 means "Definitely Not Likely," how likely is it that you would serve on active duty in the military if you were offered Program 7?

(Check One)

- | | | |
|--------------------------|---|-----------------------|
| <input type="checkbox"/> | 1 | Definitely likely |
| <input type="checkbox"/> | 2 | Probably likely |
| <input type="checkbox"/> | 3 | Somewhat likely |
| <input type="checkbox"/> | 4 | Not sure |
| <input type="checkbox"/> | 5 | Somewhat not likely |
| <input type="checkbox"/> | 6 | Probably not likely |
| <input type="checkbox"/> | 7 | Definitely not likely |

PROGRAM 8:

College scholarship benefit:

You would receive a stipend of **\$1,400** per month that would be paid for **four** academic years.

College major:

You would be required to follow a course of study that was more **vocational** than academic (examples would include computers, engineering, health, electronics, mechanics, and business).

Military entry pay:

Your starting annual salary would be **\$30,000**.

Military career field:

After you enter the military, you would be required to enter an occupation in a **technical field** (such as computers, engineering, electronics, aviation, health, or mechanics), but you would have a choice of occupation within that field.

3.8 On a scale of 1 to 7, where 1 means "Definitely Likely" and 7 means "Definitely Not Likely," how likely is it that you would serve on active duty in the military if you were offered Program 8?

(Check One)

- | | | |
|--------------------------|---|-----------------------|
| <input type="checkbox"/> | 1 | Definitely likely |
| <input type="checkbox"/> | 2 | Probably likely |
| <input type="checkbox"/> | 3 | Somewhat likely |
| <input type="checkbox"/> | 4 | Not sure |
| <input type="checkbox"/> | 5 | Somewhat not likely |
| <input type="checkbox"/> | 6 | Probably not likely |
| <input type="checkbox"/> | 7 | Definitely not likely |

PROGRAM 9:**College scholarship benefit:**

You would receive a stipend of **\$1,200** per month that would be paid for **four** academic years.

College major:

You would be required to follow a course of study that was more **vocational** than academic (examples would include computers, engineering, health, electronics, mechanics, and business).

Military entry pay:

Your starting annual salary would be **\$25,000**.


Military career field:

After you enter the military, you would be required to enter an occupation in a **technical field** (such as computers, engineering, electronics, aviation, health, or mechanics), but you would have a choice of occupation within that field.

3.9 On a scale of 1 to 7, where 1 means "Definitely Likely" and 7 means "Definitely Not Likely," how likely is it that you would serve on active duty in the military if you were offered Program 9?

(Check One)

- | | | |
|--------------------------|---|-----------------------|
| <input type="checkbox"/> | 1 | Definitely likely |
| <input type="checkbox"/> | 2 | Probably likely |
| <input type="checkbox"/> | 3 | Somewhat likely |
| <input type="checkbox"/> | 4 | Not sure |
| <input type="checkbox"/> | 5 | Somewhat not likely |
| <input type="checkbox"/> | 6 | Probably not likely |
| <input type="checkbox"/> | 7 | Definitely not likely |

 ***If you are currently disenrolled from college, please continue with Section 3A. Otherwise, please go to Question 4.1.***

3A. MILITARY ENLISTMENT OPPORTUNITIES FOR THOSE DISENROLLED FROM COLLEGE

Please fill out this section if you have some college credit—but no degree—and you are currently disenrolled from college. If you do not fit this description, please go to Question 4.1.

The previous section offered nine alternative programs that would allow someone like you the opportunity to return to college and obtain a degree prior to enlisting in the military. However, some individuals may not be interested in returning to school in the immediate future and instead may prefer to just enter the military right away, if the programs were attractive to them. This section offers three additional programs that the military might offer in the next few years.

These additional programs would not require that the individual attend college before enlistment. We'd like your opinions on these three programs. Please let us know what you think about these programs even if you are not planning to enter the military in the next few years.

PROGRAM 3A-1:**Military entry pay:**

Your starting annual salary would be **\$28,000**.

Military career field:

After you enter the military, you would be required to enter an occupation in a **technical field** (such as computers, engineering, electronics, aviation, health, or mechanics), but you would have a choice of occupation within that field.

3A.1 On a scale of 1 to 7, where 1 means "Definitely Likely" and 7 means "Definitely Not Likely," how likely is it that you would serve on active duty in the military if you were offered Program 3A-1?

(Check One)

- | | | |
|--------------------------|---|-----------------------|
| <input type="checkbox"/> | 1 | Definitely likely |
| <input type="checkbox"/> | 2 | Probably likely |
| <input type="checkbox"/> | 3 | Somewhat likely |
| <input type="checkbox"/> | 4 | Not sure |
| <input type="checkbox"/> | 5 | Somewhat not likely |
| <input type="checkbox"/> | 6 | Probably not likely |
| <input type="checkbox"/> | 7 | Definitely not likely |

PROGRAM 3A-2:

Military entry pay:

Your starting annual salary would be **\$25,000**.

Military career field:

After you enter the military, you would **not be required** to enter a particular career field. You would have your choice of occupation among those for which you are qualified.

3A.2 On a scale of 1 to 7, where 1 means "Definitely Likely" and 7 means "Definitely Not Likely," how likely is it that you would serve on active duty in the military if you were offered Program 3A-2?

(Check One)

- | | | |
|----------------------------|---|-----------------------|
| 1 <input type="checkbox"/> | 1 | Definitely likely |
| 2 <input type="checkbox"/> | 2 | Probably likely |
| 3 <input type="checkbox"/> | 3 | Somewhat likely |
| 4 <input type="checkbox"/> | 4 | Not sure |
| 5 <input type="checkbox"/> | 5 | Somewhat not likely |
| 6 <input type="checkbox"/> | 6 | Probably not likely |
| 7 <input type="checkbox"/> | 7 | Definitely not likely |

PROGRAM 3A-3:**Military entry pay:**

Your starting annual salary would be **\$25,000**.

Military career field:

After you enter the military, you would be required to enter an occupation in a **technical field** (such as computers, engineering, electronics, aviation, health, or mechanics), but you would have a choice of occupation within that field.

3A.3 On a scale of 1 to 7, where 1 means "Definitely Likely" and 7 means "Definitely Not Likely," how likely is it that you would serve on active duty in the military if you were offered Program 3A-3?

(Check One)

- | | | |
|----------------------------|---|-----------------------|
| 1 <input type="checkbox"/> | 1 | Definitely likely |
| 2 <input type="checkbox"/> | 2 | Probably likely |
| 3 <input type="checkbox"/> | 3 | Somewhat likely |
| 4 <input type="checkbox"/> | 4 | Not sure |
| 5 <input type="checkbox"/> | 5 | Somewhat not likely |
| 6 <input type="checkbox"/> | 6 | Probably not likely |
| 7 <input type="checkbox"/> | 7 | Definitely not likely |

3A.4 What were the main reasons for leaving college before completing your degree?

(Check All That Apply)

- 01 ☐ Did not have the money
- 02 ☐ Needed to work because of family obligations
- 03 ☐ Needed to stay home because of family obligations
- 04 ☐ Health reasons or physical disability
- 05 ☐ Lacked child care
- 06 ☐ Had transportation problems
- 07 ☐ Tired of going to school
- 08 ☐ Grades weren't good enough for college
- 09 ☐ Was taking too long to get a degree
- 10 ☐ Family didn't want me to continue
- 11 ☐ School didn't meet expectations / disappointed by classes and teachers
- 12 ☐ Other reason *(please specify)* _____
- _____

3A.5 In what year did you disenroll from college?

(Enter Year)

--	--	--	--

3A.6 When you were deciding to leave college, did you take any of the following actions?

(Check All That Apply)

- 01 ☐ Discussed alternative plans with a parent, spouse, or other family members
- 02 ☐ Discussed alternative plans with a professor or school counselor
- 03 ☐ Discussed alternative plans with a friend
- 04 ☐ Searched for a job in the want ads in the local newspaper
- 05 ☐ Searched for a job in the want ads in the school newspaper
- 06 ☐ Searched for a job at the school employment center
- 07 ☐ Searched the Internet for a job
- 08 ☐ Contacted a friend or relative about a job
- 09 ☐ Contacted an employer directly for an interview
- 10 ☐ Contacted a private or public employment agency
- 11 ☐ Looked at a military recruiting Web site and other military recruiting materials
- 12 ☐ Talked to a military recruiter
- 13 ☐ Sent out resumes or filled out job applications
- 14 ☐ Did nothing
- 00 ☐ None of the above

COLLEGE EXPENSES

- 4.1** How much is the tuition and other fees for the college you currently attend (if you are a current college student), attended in the recent past (if you recently disenrolled), or you plan to attend (if you are currently in high school)? Please do not include food, lodging, or other living expenses.

(Write In Dollar Amount)

\$ _____ .00

☐ Don't know → *Go to Question 4.3*

- 4.2** Is that . . . *(Check One)*

- ☐ 1 Per course credit
- ☐ 2 Per semester
- ☐ 3 Per quarter
- ☐ 4 Per school year
- ☐ 5 Don't know

- 4.3** What are the living expenses for the college you currently attend (if you are a current college student), attended in the recent past (if you recently disenrolled), or you plan to attend (if you are currently in high school)? Living expenses include: food, lodging, books, clothing, etc.

(Write In Dollar Amount)

\$ _____ .00

☐ Don't know → *Go to Question 4.5*

- 4.4** Is that:

(Check One)

- ☐ 1 Weekly
- ☐ 2 Monthly
- ☐ 3 Per semester
- ☐ 4 Per quarter
- ☐ 5 Per school year
- ☐ 6 Don't know

4.5 How do young people find money to pay for college after high school? Please indicate whether each of the following was or will be a source of financial support for your college education.

(For Each of the Following, Please Check One.)

	<u>YES</u>	<u>NO</u>	<u>DON'T KNOW</u>
a. Your parents or relatives	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>
b. Student loans	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>
c. Grants	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>
d. Academic scholarships	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>
e. Athletic scholarships	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>
f. ROTC scholarships or military educational benefits	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>
g. Other scholarships	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>
h. Your own job while attending school	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>
i. Your own savings or credit card	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>
j. Employer-provided financial aid (other than military)	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>

- 4.6** Not counting the financial support you received from your parents or relatives, did you receive any financial aid for college in the last semester or quarter? For those who are out of college, please answer for the last semester or quarter in college before you disenrolled. For those in high school, please answer for the first semester or quarter you will be enrolled.

(Check One)

- 1 ☐ Yes → *Continue with Question 4.7*
 2 ☐ No → *Go to Question 5.1*
 3 ☐ Don't know → *Continue with Question 4.7*

- 4.7** What kind of financial aid did you (will you, for high school students) receive?

(Check All That Apply)

- 1 ☐ Federal aid (e.g., Pell Grant, Stafford Loan, Work Study, or SE-OG)
 2 ☐ State aid
 3 ☐ Aid provided by your school
 4 ☐ Aid provided by your employer
 5 ☐ Other aid (e.g., merit awards or philanthropic awards)
 6 ☐ Don't know

- 4.8** If you received or will receive college financial aid, what is the total amount you got in the last quarter or semester or will get in your first quarter or semester (for high school seniors)? Please do not count the financial support from your parents or relatives.

(Write In Dollar Amount)

\$ _____ .00

- D ☐ Don't know

EMPLOYMENT STATUS

5.1 Are you currently employed, either full-time or part-time?

(Check One)

☐ Yes

☐ No → *Go to Question 5.6*

5.2 Altogether, how many jobs do you have, including part-time, evening, or weekend work?

(Enter Number of Jobs) _____

5.3 Altogether, how many hours per week do you usually work?

(Enter Number of Hours per Week) _____

5.4 What is your best estimate of your earnings from all jobs combined, before taxes and other deductions?

(Write In Total Earnings)

\$ _____ .00

☐ Don't know → *Go to Question 6.1*

5.5 Is that:

(Check One)

☐ Yearly → *Go to Question 6.1*

☐ Monthly → *Go to Question 6.1*

☐ Twice a month → *Go to Question 6.1*

☐ Every two weeks → *Go to Question 6.1*

☐ Weekly → *Go to Question 6.1*

☐ Hourly → *Go to Question 6.1*

☐ None of the above → *Go to Question 6.1*

5.6 What are the main reasons that you are not currently working?

(Check All That Apply)

- 01 ☐ No need to
- 02 ☐ No work in my field was available
- 03 ☐ Couldn't find any work
- 04 ☐ Lack schooling/training/skills
- 05 ☐ Employers think too young/old
- 06 ☐ Can't arrange child care
- 07 ☐ Family responsibilities
- 08 ☐ In school or other training
- 09 ☐ Health/medical limitations
- 10 ☐ Transportation problems
- 00 ☐ None of the above

5.7 If you are not currently employed, when did you last work for pay at a regular job or business, either full- or part-time?

(Check One)

- 1 ☐ Within past 12 months
- 2 ☐ Between one and two years ago
- 3 ☐ More than two years ago
- 4 ☐ Never worked
- 5 ☐ Don't know

5.8 If you are not currently employed, are you actively looking for work now?

(Check One)

- 1 ☐ Yes
- 2 ☐ No

ABOUT YOU

6.1 Are you male or female?

(Check One)

- ₁ ☐ Male
₂ ☐ Female

6.2 Do you have a regular high school diploma, GED, ABE, or some other type of certificate of high school completion?

(Check One)

- ₁ ☐ Currently in high school → *Go to Question 6.6*
₂ ☐ Regular high school diploma
₃ ☐ Adult Basic Education (ABE, correspondence, or night school)
₄ ☐ GED (General Educational Development Equivalency Certificate)
₅ ☐ Some other type of certificate of high school completion
₀ ☐ Don't have a high school degree and not currently in school

6.3 Are you enrolled in school now or will you be enrolled in school within the next few months?

(Check One)

- ₁ ☐ Yes
₂ ☐ No → *Go to Question 6.7*

6.4 What grade or year of school are you in?

(Check One)

- ☐ 01 12th grade
- ☐ 02 first year (freshman) in a four-year college or university
- ☐ 03 second year (sophomore) in a four-year college or university
- ☐ 04 third year (junior) in a four-year college or university
- ☐ 05 fourth year (senior) in a four-year college or university
- ☐ 06 first year in a two-year junior or community college
- ☐ 07 second year in a two-year junior or community college
- ☐ 08 third year in a two-year junior or community college
- ☐ 09 first year in a vocational, business, or trade school
- ☐ 10 second year in a vocational, business, or trade school
- ☐ 11 third year in a vocational, business, or trade school

6.5 Are you enrolled full-time or part-time?

(Check One)

- ☐ 0 Not enrolled → *Go to Question 6.7*
- ☐ 1 Enrolled full-time
- ☐ 2 Enrolled part-time

6.6 Currently, how many college semester or quarter credits are you taking?*(Check One)*

- ₀ ☐ None
₁ ☐ Semester credits

(Enter Number of Semester Credits) _____

- ₂ ☐ Quarter credits

(Enter Number of Quarter Credits) _____

- ₃ ☐ Don't know

6.7 In total, how many college semester or quarter credits have you completed?*(Check One)*

- ₀ ☐ None
₁ ☐ Semester credits

(Enter Number of Semester Credits) _____

- ₂ ☐ Quarter credits

(Enter Number of Quarter Credits) _____

- ₃ ☐ Don't know

6.8 What is (or will be) your college major?*(Check One)*

- ₀ ☐ Not currently enrolled in college AND have no plans to attend college in the next few years
₁ ☐ I don't have a major yet (i.e., undeclared)
₂ ☐ Have a major decided

(Enter Major) _____

6.9 Is/Was your high school program:

(Check One)

- 1 ☐ Academic or college preparatory
 - 2 ☐ Commercial or business training
 - 3 ☐ Vocational or technical
 - 4 ☐ Other *(Please Specify)*
-

6.10 What grades do/did you usually get in high school?

(Check One)

- 1 ☐ Mostly As
- 2 ☐ Mostly As and Bs
- 3 ☐ Mostly Bs
- 4 ☐ Mostly Bs and Cs
- 5 ☐ Mostly Cs
- 6 ☐ Mostly Cs and Ds
- 7 ☐ Mostly Ds and lower

6.11 What is your marital status?

(Check One)

- 1 ☐ Married
- 2 ☐ Widowed
- 3 ☐ Separated
- 4 ☐ Divorced
- 5 ☐ Single and have never been married

6.12 How many children do you have?

(Enter Number) _____

OR 0 ☐ None

6.13 Are you Spanish/Hispanic/Latino?*(Check One)*

- 1 ☐ No, not Spanish/Hispanic/Latino
 2 ☐ Yes, Mexican, Mexican American, or Chicano
 3 ☐ Yes, Puerto Rican
 4 ☐ Yes, Cuban
 5 ☐ Yes, other Spanish/Hispanic/Latino

6.14 What is your race?*(Check One)*

- 1 ☐ White
 2 ☐ Black or African American
 3 ☐ American Indian or Alaskan Native
 4 ☐ Asian (e.g., Asian Indian, Chinese, Filipino, Japanese, Korean, or Vietnamese), Native Hawaiian, or other Pacific Islander (e.g., Samoan, Guamanian, or Chamorro)
 5 ☐ Some other race
(Print Race)
-

6.15 In what U.S. state or territory do you live?*(Enter State or Territory Name)* _____**6.16 What is your age?***(Check One)*

- 17 ☐ 18 ☐ 19 ☐ 20 ☐ 21 ☐

6.17 In broad terms, what is your total annual household income? Please include your parents' or guardians' total income, even if you live outside their home.*(Check One)*

- 1 ☐ \$0–\$25,999
 2 ☐ \$26,000–\$50,999
 3 ☐ \$51,000–\$75,999
 4 ☐ \$76,000–\$100,000
 5 ☐ Over \$100,000
 6 ☐ Don't Know

6.18 What is the highest grade or year of school that your mother completed?*(Check One)*

- 01 ☐ Eighth grade or less
 02 ☐ Ninth grade
 03 ☐ Tenth grade
 04 ☐ Eleventh grade
 05 ☐ Twelfth grade

- 06 ☐ Two-year Associate degree
07 ☐ Four-year Bachelor's degree
08 ☐ Vocational, business, or trade school degree
09 ☐ Advanced degree (Master's, PhD, Law, MD)
10 ☐ Some college, but no degree
11 ☐ Don't know

6.19 Has your father ever been in the military?
(Check One)

- 1 ☐ Yes
2 ☐ No
3 ☐ Don't know

6.20 Has your mother ever been in the military?
(Check One)

- 1 ☐ Yes
2 ☐ No
3 ☐ Don't know

6.22 What is today's date?
(Enter Date)

--	--	--	--	--	--

Thank you for taking the time to complete this survey.

Discussion with Military and Community College Representatives

The specific levels of the four attributes chosen to be included in the survey are subject to judgment and are not precise. Nonetheless, to help ensure that the attributes and the levels are sensible from the military's standpoint and attractive from the youths' perspective, we met with a variety of individuals knowledgeable about military recruiting and about youth schooling and career aspirations. We consulted available studies, and we relied on statistical resources. We also conducted focus groups, the results of which are the primary focus of Appendix D. This appendix summarizes some of the key insights we learned from the non-focus group activities.

Discussions with Military Recruiting Personnel and with College Job Counselors

Our development of the hypothetical policy options began with several visits to individuals and groups we thought might provide useful input. We met with individuals knowledgeable about military recruiting and with those knowledgeable about youths' career aspirations. The former group consisted of a wide variety of personnel at the U.S. Army Recruiting Command, the Office of the Army Chief of Staff, the U.S. Navy Recruiting Command, and the Center for Naval Analyses. The latter group included the job placement officers at Los Angeles City College (LACC) and Santa Monica City College (SMC). LACC is a two-year college located in a lower- to middle-class neighborhood in midcity Los Angeles and is a school that tends to serve older students who are returning to school after milling around in the youth labor force. SMC is a two-year college located in Santa Monica, California, in a middle- to upper-middle-class neighborhood. It is a school that tends to serve students who recently graduated from high school and who plan to transfer to a four-year university such as the University of California at Los Angeles (UCLA) upon receiving an associate's degree. Although the school is located in a higher-income area, SMC has a strong reputation and draws students from all over Los Angeles. Consequently, many students at SMC are from low-income families, and many are working while attending school. Finally, we met with knowledgeable individuals in the Office of the Secretary of Defense, including the Director for Accession Policy, the Deputy Assistant Secretary of Defense for Military Personnel Policy, and the Under Secretary of Defense for Personnel and Readiness.

The purpose of the meetings was to find out if there were any particular college recruiting policy options that were of special interest to the military, to find out the type of options that might be interesting to youth in the college market, to get a better feel for the decisionmaking process that college market youth undertake in pursuing their goals, and to discover the challenges youth face in doing so. The purpose was not to do an in-depth and comprehensive study of these issues, but to get a general feel for the answers to these questions from

knowledgeable people. Consequently, the individuals with whom we chose to meet were not a representative group of individuals or a complete group. For example, because of budget constraints, we did not meet with individuals from every service or from a large number of colleges. We also did not meet with any placement officer at a four-year college. Therefore, the views and opinions of those with whom we met may not generalize. Yet, despite the lack of comprehensiveness, we gathered useful information that perhaps could help the military understand and become more successful recruiting youth on college campuses.

Most of what we learned from our visits with individuals from the services related to their existing recruiting programs targeted to the college market and to their ongoing challenges to reach this market. Since these programs have been documented elsewhere and the challenges are the impetus for this study, we do not summarize here the information we obtained from the services.

Instead, the focus of the discussion below is on what we learned from the job placement officers at the two-year-college campuses that we visited. Some of the key comments we got from the job placement representatives on each campus were:

- To find a job following graduation, students generally rely on the resources and contacts provided by the academic department that corresponds to their major. For example, individuals pursuing a degree in medical technology generally get a medical technician job using the resources available in the medical technology department. While the job placement office helps the students learn about their job preferences and gives them information about career opportunities in general, the office often was not used as the job finder. The implication for recruiting is that the key influential contacts on campuses are not just the campus job placement officer but rather the placement officers associated with each academic department. Consequently, recruiters will need to contact numerous departmental personnel on campus to effectively reach the key influential contacts on college campuses.
- Because of lack of funding in the case of LACC, relatively little information was available on the demographic composition of the student body. While both campuses had Web sites describing their respective schools, the SMC Web site provided considerable information on student body characteristics and other information of potential relevance to a military recruiter. Given the inconsistency of reporting information, recruiters may need to find sources of demographic information other than the school.
- The placement officer at LACC indicated that many students get financial aid. While she did not have exact figures, her guess is that many received state aid as well as federal Pell grant aid. Since national statistics indicate that a lower fraction of two-year college students get financial aid than four-year university students, the large percentage of aid recipients at LACC may reflect the lower socioeconomic status of the school in general and the fact that most government student financial aid programs are focused on serving those in financial need.
- According to the placement officer at SMC, the vast majority of students do not know what they want to do following graduation. Most of the students are not aware of the opportunities available outside of college, or if they do, their notions are pretty naive and vague. In other words, they did not seem all that more sophisticated about the world of work than younger high school seniors. Of course, this generalization may reflect the relatively young student body at SMC.
- The placement officer at SMC noted that most of the students on the SMC campus seem to hope and expect to get jobs following graduation that offered big and fast money. That is, they are highly motivated by money in his assessment. On the other hand, they may not have a realistic expectation about their job prospects and the likelihood that they will have to start off at a relatively low level of entry pay and only earn more money with time on the job. Students seem to think that in the dot-com economy, high-paying jobs are easy to find. According to the placement officer, students also seem to be focused on quick rather than slow results.

- Somewhat contradictory to the previous point, the placement officer at SMC also recommended that the military focus on selling students on the idea of a career rather than a job. That is, they should educate students about the career opportunities the military offers rather than about what might be viewed by students as a temporary job. In his assessment, students didn't see the military as a career option, just something to do for a short while.

The placement officer at SMC indicated that several of the large businesses in the area invest heavily in the college's programs and infrastructure. For example, they provide generous grants that permit high-quality concert and lecture series; they endow chairs for faculty, sponsor athletic events, and have helped in the property development and upgrading of buildings. In other words, these businesses take significant steps to develop brand name recognition among students and faculty by sponsoring highly visible activities and projects. In contrast, the military's presence usually involved campus visits by recruiting personnel to meet with students or interact with faculty and administrators. The placement officer gave the example of a recruiter who sets up his or her table on the campus square periodically. This effort was viewed as showing far less of a commitment to campus life than the efforts of the major employers in the area. Therefore, the military is not viewed as a presence on campus in the same way as the major employers in the area.

Design for the Additional 12 Programs for Dropouts

The choice of which 12 additional combinations to include in the survey for the dropouts could not be accomplished with a D-optimal design because it involved only two factors. D-optimal design does not work well with a very small number of noncontinuous factors. The two factors were “Entry Pay and Bonus” (9 levels) and “Type of Occupation” (2 levels). We employed a fractional factorial design approach. Most textbooks only cover fractional factorial designs where each factor has 2 or 3 levels. We therefore give a more detailed description here of how to address two factors with 2 and 9 levels.

We needed to select 12 (3×4) out of 18 (9×2) possible combinations. A common trick in factorial experiments is to represent one variable with many levels as two or three variables with fewer levels. In these cases we represent the 9-level variable as two 3-level variables (one can combine two 3-level variables in nine different ways). We then choose two random $1/3$ fractions of a design with two 3-level variables.

The following discussion is technical. In order to select a fraction one needs to specify a random defining relation. Denote the two 3-level factors by A and B . We choose the defining relation:

$$I = A^2 B = A B^2.$$

The actual levels can then be determined from the corresponding equation:

$$2a + b = x \text{ (modulo 3)}$$

where x takes the values 0, 1, or 2. Since we wish to choose two $1/3$ fractions, we choose $x = 0$ for the first fraction and $x = 1$ for the second fraction.

This equation holds true for the following tuples $(a, b) : (0,0), (1,1), (2,2), (0,1), (2,0), (1,2)$ —the first three tuples correspond to $x = 0$ and the remainder to $x = 1$. We retranslate these six 2-tuples into 6 levels of the 9-level variable. We use the following lookup table to transform a 2-tuple into a 9-level variable:

The 6 levels selected are thus 0,2,3,4,7,8. Crossing this design with the 2-level factor (levels denoted by -1 and 1) we obtain the following 12-run design matrix (9-level, 2-level): $(0,-1), (0,1), (2,-1), (2,1), (3,-1), (3,1), (4,-1), (4,1), (7,-1), (7,1), (8,-1), (8,1)$.

Usually one attaches these 12 runs to blocks by aliasing a high order interaction effect with the blocks. When the high order interaction is thought to be negligible, this has the advantage that the blocks are orthogonal to the effects, which leads to the smallest standard errors possible.

We cannot alias blocks with high order effects since the 9-level factor is prime with the number of blocks needed, namely four, and there is only one 2-level factor. We therefore randomly assign blocks to the runs, subject to the constraints that each block has three policy options, that the main effect for the 2-level factor must not be aliased to the blocking structure, and that the three options within any one block do not all have the same level of the 2-level variable. While we do not have orthogonality, we are still able to estimate all effects (with somewhat larger errors than would be expected under orthogonality).

The random order is shown in Table C.2. This translates to the design shown in Table 2.7 in the main body of the report.

Table C.1
Lookup Table to Convert Two 3-Level Variables into One 9-Level Variable

Nine-Level Variable	Three-Level Variable	Three-Level Variable
0	0	0
1	1	0
2	2	0
3	0	1
4	1	1
5	2	1
6	0	2
7	1	2
8	2	2

Table C.2
Random Order

Order	Entry Pay	Occupation	Block
1	7	-1	1
12	0	1	1
3	0	-1	1
4	2	1	2
5	2	-1	2
6	8	1	2
7	4	1	3
8	4	-1	3
9	8	-1	3
10	3	-1	4
11	3	1	4
2	7	1	4

Insights from the Pretest and Participant Discussions

As discussed in Chapter Two, the purpose of the pretest was twofold. First, we wanted to obtain information and input about whether some of our survey methods and assumptions were reasonable. We also wanted to know whether the survey instrument was clear and structured appropriately to solicit the information we wanted.

Three pretests were conducted with groups who were eligible to participate in our survey. Each group was composed of nine participants, a figure determined by the Office of Management Budget (OMB). This figure is the maximum number of participants that is allowed by OMB without obtaining prior OMB clearance for the information collection effort. Each participant was paid \$50 for participating in the two-hour session. The groups were moderated by two individuals, a RAND survey research coordinator and the principal investigator of the project.

This appendix briefly describes the method used to select the participants, the format that was used to conduct the pretest, and the lessons and anecdotes that we learned.

Selection of Participants

The participants were recruited by a local Los Angeles professional vendor, Focus LA, that recruits focus groups for advertisers. The vendor made calls from a list it maintains of youth in the Los Angeles area. The vendor followed a script that we wrote. The script explained the project and the purpose of the focus group session and screened individuals to ensure that they were eligible to participate. Additionally, the screening instrument was used to ensure that we recruited a mix of individuals from a variety of demographic and socioeconomic backgrounds. The script that we wrote for the vendor to recruit the participants is in Table D.1.

To ensure that we had participants with a variety of backgrounds and views, we requested that the vendor recruit individuals who differed in terms of race/ethnicity, gender, and household income. The guidelines we gave to the vendor in screening potential participants with respect to their background is shown in Table D.1. Because of the large population of biracial and multiethnic families in the Los Angeles area, we instructed the recruiter to allow individuals to classify themselves how they preferred. If the individual identified him or herself as belonging to one of the target groups in Table D.1, he or she could be assigned to that group, as indicated in the table. Regarding household income, we limited the number of participants from high-income families (over \$100,000) because previous research indicates that youth from these families are less likely to enlist, other factors held constant (Kilburn and Klerman 1999). As for gender, the target population for the focus groups was primarily male because more than three-quarters of enlistees each year are male.

Table D.1
Recruiting Guidelines for Pretest Recruiter

Classification	Guidelines
Race/Ethnicity	Caucasian: Recruit no more than two to three per focus group. African American: Recruit no more than three per focus group. Hispanic: Recruit no more than three per focus group. Other race/ethnicity: None recruited. Biracial: Record choice and count it toward that racial group guideline. If that race group is not needed to meet the guideline, then reject the individual. If individual says "both," then count individual toward either group or the group for which the quota was still open.
Total family income before taxes	Under \$20,000: None \$20,000–\$75,000: Include \$75,001–\$100,000: Recruit no more than four per group. Over \$100,000: None
Gender	Male: Need two-thirds males in each focus group. Female: Need one-third females in each focus group.
Served in military, enlisted, been in college ROTC or junior ROTC	None
U.S. citizen or permanent resident	All

The vendor also was requested to recruit only individuals who were not currently serving in the military, or had not recently enlisted, and had not enrolled in college or junior ROTC. The purpose of this restriction was to ensure input came from individuals who had not already decided to join the military. Such individuals are likely to comprise a large portion of the survey's sample, and we wanted to ensure getting their input.

Another restriction was to recruit only individuals who were either U.S. citizens or permanent residents. Since temporary residents cannot enlist, we wanted to exclude them from the focus groups. Finally, because some of the focus group members were age 17 and not legal adults, the vendor obtained parental consent for these participants. The parental consent portion of the screener explained to the parent the purpose of the focus group session, indicated that it was being paid for by the DoD, but that their child's name would not be shared with anyone outside of the group, and all participants would be called by their first name only.

Finally, the vendor informed the individuals it recruited that they would not be contacted by the military or by a military recruiter as a result of participating in the focus group sessions. Their privacy would be protected and their names would not be released to anyone outside of the RAND research group conducting the study.

Pretest Format

The format of the session had four components: (1) a 5-minute welcome and introduction; (2) a 10-minute explanation of the purpose of the pretest and what participants would be asked to do; (3) a period of 40 minutes to complete the survey and a short comment sheet upon finishing the survey; and (4) a 60-minute structured group discussion. These components are briefly described in more detail below.

The sessions began with an introduction by the moderators who briefly described RAND and the project's background and goals. Participants were then asked to briefly introduce themselves and tell the group something about themselves, such as their school, their year in college, or their hobbies. Everyone had a name tag with only the first name printed on it. Participants were told that the session would be tape-recorded, but

only for the purpose of allowing the researchers to recall what had happened. Participants were asked if they objected to the recording of the session. No one stated an objection.

Participants were then told about the purpose and scope of the survey. They were told that the survey would be conducted in the winter of 2001, it would be nationally representative, and it would include a sample of individuals much like themselves. They were told that the survey was being conducted on behalf of the Department of Defense and that it would ask individuals their opinions about a set of hypothetical policies that the military might introduce over the next few years. They were told that the results of the survey would help the military decide which policies are likely to be the most successful in recruiting college-bound young adults, and by participating in the focus group phase of the study, they would be providing extremely valuable input that would help shape the military's recruiting policies in the years to come. They were also told that their participation was much appreciated by the leadership in the Department of Defense who was sponsoring the study.

Following the introduction, the moderators then explained the concept of pretest. The participants were told that the purpose of the pretest was to get their input regarding the survey—both its clarity and substance—and an estimate of how long it would take to fill out the survey. The moderators explained that the participants would be given a hard copy of the survey and 40 minutes to fill it out and write comments on a comment sheet that was given to them. Participants were encouraged to give their honest input, even if they had a negative disposition to the military, and to provide any suggestions that they think would improve the survey, both in terms of clarity and substance. They were reminded that the purpose of the pretest was to test the survey and not to test them.

The comment sheet had two purposes: (1) to obtain specific information about which questions or response categories in the survey instruments were unclear to the participants and to get input on how to make them clearer; and (2) to solicit their views about the feasibility of our planned survey procedure for sending the survey and obtaining responses from the sample when the survey was actually conducted in the winter 2001.

Regarding the clarity portion of the comment sheet, participants were asked to indicate how long it took them to complete the survey and to rate on a scale of 1 to 5 how hard it was to answer, how clear the instructions were, and how clear the terminology was. The comment sheet included plenty of space to indicate which questions were unclear and what the problem was with the indicated questions. The participants were also asked to make suggestions about how to improve the wording of questions that they found unclear.

Regarding the portion of the comment sheet pertaining to survey procedures, participants were asked to rate how likely it would be that they would fill out the survey if they got it in the mail, how they would prefer to receive the survey (by mail, telephone, or online), and if they would be more likely to fill it out if they got a small monetary incentive. They were also asked if their parents would provide us with their contact information if we did not have it or if their parents would forward the survey to them. The comment sheet concluded with open space for the participants to make any other comments they felt necessary.

Following a 10-minute break, the moderators conducted a semistructured, 60-minute group discussion. The questions differed for each group, reflecting their composition of high school seniors, college students, or dropouts. Furthermore, depending on the session, not all questions were asked, because the moderators wanted the opportunity to pursue useful but unexpected topics that might be raised by the participants.

The semistructured discussion for college students focused on the following questions:

- What did they generally think of the survey and the topics covered in it?
- How much did it cost to go to college and to cover living expenses? How do young adults pay for college and for their living expenses?
- What did they think of the hypothetical programs offered in the survey? What went through their minds as they were reading them?

- Were the hypothetical programs believable? Were they attractive and if so, in what way?
- What salaries do two-year and four-year college graduates typically start at when they enter their first full-time job?
- What were their career aspirations and what kind of jobs or environments did they envision working in their first job after college?
- How easy is it to find a job after college? Did they think their opinions were typical of others like them (i.e., college students)?

The semistructured discussion for college-bound high school seniors focused on the same questions, but also included questions about whether they talked to their parents about attending college, and if so, what they talked about. The semistructured discussion for youth who had recently disenrolled from college also included similar questions to those asked of the college student group, but that discussion also covered the main reasons why people leave college without obtaining a degree.

Precomment Sheet Findings

Uniformly across groups, the participants indicated that the survey was easy to fill out, had clear instructions, and used easy-to-understand concepts and terminology. On a scale of 1 to 5 with 1 indicating “easy,” the average score was 1.85 (with a standard deviation of 0.91) among the 27 participants regarding whether the survey was easy or difficult to answer. The average score was 1.55 (with a standard deviation of 0.64) regarding whether the instructions were clear or not, and the average score was 1.77 (with a standard deviation of 0.97) regarding whether the concepts were clear or not. Only a handful of the respondents indicated on the comment sheet that specific questions or response categories were problematic, and even these individuals only indicated one or two problems that they confronted with the survey.

Despite the apparent clarity of the survey as indicated on the comment sheets, the respondents made numerous written comments in the margins of their copies of the survey regarding problems of clarity. Furthermore, in examining their survey responses after the conclusion of the sessions, we noticed that questions in one section of the survey—the part on college financial aid—were often left blank suggesting that respondents were unclear about the questions. Furthermore, during the group discussions, participants made several recommendations on how to make the survey better and easier to understand.

As a result of what we learned from the marginalia, blank responses, and comments provided during the general discussions, we made numerous changes to the survey to improve its clarity. Consequently, the final versions of the survey instruments were significantly improved as a result of the focus group sessions. First, we made many wording changes to the question and response categories. Second, we shortened the survey somewhat by eliminating what appeared to the participants to be repetitive questions. Third, because several participants suggested during the general discussions that we move the policy scenarios closer to the beginning of the survey since this was the main purpose of the survey, we implemented this suggestion as well in the revised survey instruments. Finally, we rewrote the section on paying for college to make clearer what types of costs and what time frame we were interested in learning about.

Findings from the Pretest Discussions

As noted above, the group discussions were semistructured open forums that took about one hour. Although we sought responses to a set of questions, we also allowed the discussion to drift in useful but unforeseen direc-

tions. In every case, we ran out of time before obtaining answers to all the questions we had prepared prior to the sessions.

The first part of each group discussion session was devoted to going over any problems they had in filling out the survey and where the participants felt that we could improve the clarity of the survey instrument. These problems and suggestions were discussed earlier in this section and will not be repeated here.

The following discussion summarizes issues that were raised regarding such topics as the planned survey procedure, the substance of the survey, the participants' views regarding the military, schooling, and career aspirations, and opinions regarding what individuals like them might earn in a civilian job once they had a college degree. The discussions differed among the sessions. For that reason, we discuss the sessions separately for each group.

Many of the issues and responses of the session participants raised during the sessions ran counter to our findings from the actual survey, reported in Chapters Five through Seven. Thus, the views and opinions expressed by group members do not always represent the majority of youth.

College-Bound High School Seniors

For the high school senior group, a considerable amount of time was devoted to discussing what the participants thought of the nine hypothetical scenarios that were offered in the survey and what they thought of the military in general. Some of the main comments were:

- The enlistment interest with respect to the nine scenarios of a few participants was influenced by the restriction on the college major. These participants reacted quite negatively to the idea that they would be restricted in their choice of college major. They wanted the flexibility to choose their major, even if it was more academic than vocational.
- Several high school seniors indicated that the level of entry pay and bonus amounts indicated in the survey were not high enough, even the highest amount of \$31,000. Several of them indicated that in today's hot economy, a college graduate could earn a lot of money. Several of them had anecdotes of college graduates whose entry pay was significantly higher than the entry pay and bonuses being offered in the survey.
- On the other hand, a couple of participants suggested that the amount of money being offered by the options seemed so high as to make the military look desperate for recruits. If the military has to pay so much money, it must be an awful place to work, in their view.
- All of the participants had a negative view of the military as a job or career option. They all considered the military to involve dangerous work, and they thought the amount of money being offered did not compensate adequately for the perceived danger.
- Other reasons expressed by the participants for why they had a negative view of the military as a career option included: "too much discipline," "lack of sleep," "rules, like how to fold your socks a certain way," and "getting yelled at." A few participants had anecdotes about how harsh military life was, based on the experience of friends and relatives.
- It was generally agreed that the cost of attending a two-year college, including living expenses, was around \$12,000 to \$15,000 per year in Los Angeles. All participants said they thought that the cost of living in Los Angeles was high.
- It was also generally agreed that an individual with a two-year degree could earn about \$25,000 per year as soon as he or she left school, while an individual with a four-year degree could earn anywhere from \$35,000 to \$65,000. Again, several participants had anecdotes of college graduates who had starting salaries that were quite high, over \$50,000.

- None of them expressed any concern about finding a job after they finished college. They had great confidence that jobs and careers were plentiful for a college graduate and that having a guarantee of a job from the military was not much of a benefit. Several participants offered anecdotes of private companies that offered guaranteed jobs after college graduation. Therefore, they did not see enlistment in the military as a necessary step to getting such a guarantee.

College Students

For the college student group, a considerable amount of time also was devoted to discussing what the participants thought of the nine hypothetical scenarios that were offered in the survey, what they thought of the military in general, and their college major and career aspirations. Some of the main comments were:

- Like their high school counterparts, several of the college students said that in considering the nine different hypothetical options, they did not like the requirement that they had to major in a vocational area while in college. They preferred to have more flexibility in choosing their college major.
- Several participants found the options offering higher entry pay or a bonus particularly attractive. The dollar amounts seemed like a "good deal."
- Several participants also felt that the college stipend benefits that were offered, such as the \$1,200 per month stipend, were meaningful benefits that would cover a significant fraction of their costs.
- A couple of participants indicated that the \$150 stipend was far too small, even though it was coupled with a \$65,000 loan repayment.
- A few said that the college benefit was more important to them than the level of entry pay. That is, they preferred options that offered higher college stipends over those that offered higher pay.
- Like the high school seniors, many of the college students expressed a negative view of enlistment in the military. Some of the comments included: "Boot camp is a turn off," "I'm not a morning person," "The drill sergeant is like an enemy," and "[I] don't want to have to respond instantly to commands." Several participants had anecdotes about how boot camp was not pleasant, based on the experience of relatives and friends.
- Nearly all participants, seven of the nine, lived at home with their parents/guardian while they attended college. Of the remaining two participants, one lived in a college dormitory. It was agreed that the average living expense per month was between \$500 and \$600. The student living in the dormitory said the monthly cost was significantly higher for him.
- Regarding their views about what the starting salary was for a college graduate, the range was enormous. One participant, currently majoring in fashion design, said that the starting salary in fashion design was \$65,000. One participant mentioned that in information technology, the starting salary was \$80,000 to \$100,000. One participant currently majoring in photography indicated that a photographer could start at \$50,000. Yet another participant indicated that for a two-year college graduate in communications (which was her major), the starting salary was about \$35,000.
- The participants discussed the type of environment in which they envisioned working when they finished college and the kind of job they wanted. Seven of the participants answered the question as follows: "academic career," "basketball," "journalism," "high school coach," "no structure, just a professional calling the shots," and "helping people."
- When asked if they thought the military might provide the type of environment or job they envisioned, they answered as follows: "no," "possibly," "yes, public service," "yes, because it has a lot of structure," "no, they have nuclear weapons and they don't need people these days," and "the military has nothing to do with what I want to do with my vocation."

College Dropouts

Some of the key comments from the college dropouts were:

- The scenarios with the bonuses were the most attractive to several of the participants. They indicated that such a bonus would enable them to pay off a car loan, to buy a car, or even start one's own business.
- The idea of returning to college was not appealing to a couple of the participants. For them, only the options that paid a lot of money, either in pay or bonuses, were attractive. The options with greater college benefits were not attractive.
- Most of the participants said they did want to return to college eventually. Several of them expressed interest in the LRP that offered repayment of federal student loans up to \$65,000.
- Several participants did not like the idea of having to major in a vocational area. They found this requirement too restrictive.
- Most, but not all, of the participants seemed to have a negative view of enlistment in the military. Some of the comments included: "it's controlled by the government and the government is deceiving," "it's not cool," "no club feeling," "no respect for it," and "it used to be an honor, but nowadays it is not." One participant said that he thought the military was the career option of last resort because the work was "too hard."
- When asked about why they disenrolled from college, the responses included: immaturity; lack of transportation; needed a break from school; became pregnant; lacked financial resources; courses weren't interesting; courses weren't available.
- When asked about what they thought a four-year college graduate would earn upon graduation, the participants gave a range of \$40,000 to \$60,000. For someone with less education, a range of \$25,000 to \$35,000 was mentioned by a few of the participants.
- In terms of future aspirations, the participants mentioned the following: no idea; law school; working outside; law enforcement; engineering technician; management; physician assistant; contractor; freelance artist.

A Simulation-Based Approach to Determine Power for Regression

The purpose of power calculations is to determine whether the proposed sample size is large enough to detect an effect of specified size. What “large enough” means is expressed formally through the concept of power. The power is the probability of incorrectly rejecting the hypothesis that the effect is zero. The power of the test increases as a function of the effect size. (In other contexts power is also referred to as “true positive” or sensitivity.)

Usually the power to detect an effect is computed based on a single variable. Power calculations for regression are more difficult than ordinary power calculations. Power calculations for regression require additional information about the regressors and their correlations.

We describe here a simulation-based approach to assess the power in the regression context. The purpose of the simulation is to get an estimate of the standard errors of the regression coefficients. We then use the largest standard error of the estimated parameters and use it for an ordinary power calculation.

This simulation-based approach is especially useful when there are several design variables of interest and a design matrix for these variables is readily available. A simulation is also useful to confirm that all parameters are identifiable—in other words, to confirm that no parameter is aliased (or 100 percent correlated) with a combination of other parameters.

Order of Simulation

1. **Build a regression model.** The regression model consists of a response and the design (or X) matrix. The design matrix for the linear model is given and need not be simulated. (Some recoding for dummy variables might be required.) Interactions can be added as desired. Values for the response variable are drawn at random from a conservative distribution (e.g., triangular, uniform). A conservative procedure is a procedure that will not underestimate standard errors. Inappropriately small standard errors might lead to false significant results. Because the model consists only of fixed effects, simulating values for the response variable is equivalent to simulating values for the error term.
2. **Estimate the vector of coefficients β and standard errors.** The response is regressed on the design matrix to estimate β and the standard error of β . Because β is normally distributed, the standard error of any β can be used in ordinary power calculations for a normal distribution.
3. **Rescale the standard error.** The standard error in the simulation is a function of the number of observations used in the simulation. For the power calculations the standard deviation for a single observation is needed. Therefore the standard error need be rescaled as follows:

$$se(\beta) = se(\beta_{n_0}) \sqrt{n_0}$$

where n_0 is the number of observations used in the simulation and $se(\beta_{n_0})$ is the standard error of β in the simulation.

4. **Employ power calculations.** Power calculations are performed in the usual manner (see Cohen, 1992) to compute the sample size or minimal effect detectable. It is sufficient to conduct just one power calculation with the largest standard error among the parameters of interest. Parameters with smaller standard errors will have more power.

Lessons Learned from Implementing the Survey

Response by Survey Mode

Figure F.1 reports the cumulative number of responses received from both the Internet and the mail response option over time.

Only 38 percent (976 out of 2,580) of the eligible responses were received on the Internet. The percentages of Web respondents were somewhat similar for high school students (35 percent), college students (39 percent), and dropouts (31 percent). The hypothesis that all three groups have the same percentage is borderline significant ($\alpha = 0.03$). Only 15 youth requested a mail questionnaire before questionnaires were mailed out as part of the second follow-up. Some responses were received after the closing of the survey response period.

The Web responses are more evenly spread across the fielding period than the mail responses. For the mail responses the effect of mailing the hard copies of the questionnaires (some of which were combined with incentives) are immediately visible in Figure F.1. At least visually, the effect of any of the reminders or incentives is less obvious for Web respondents. This implies that the hypothesis “Web survey respondents tend to respond either right away or not at all” does not hold here.

The Percentage of Eligible Respondents

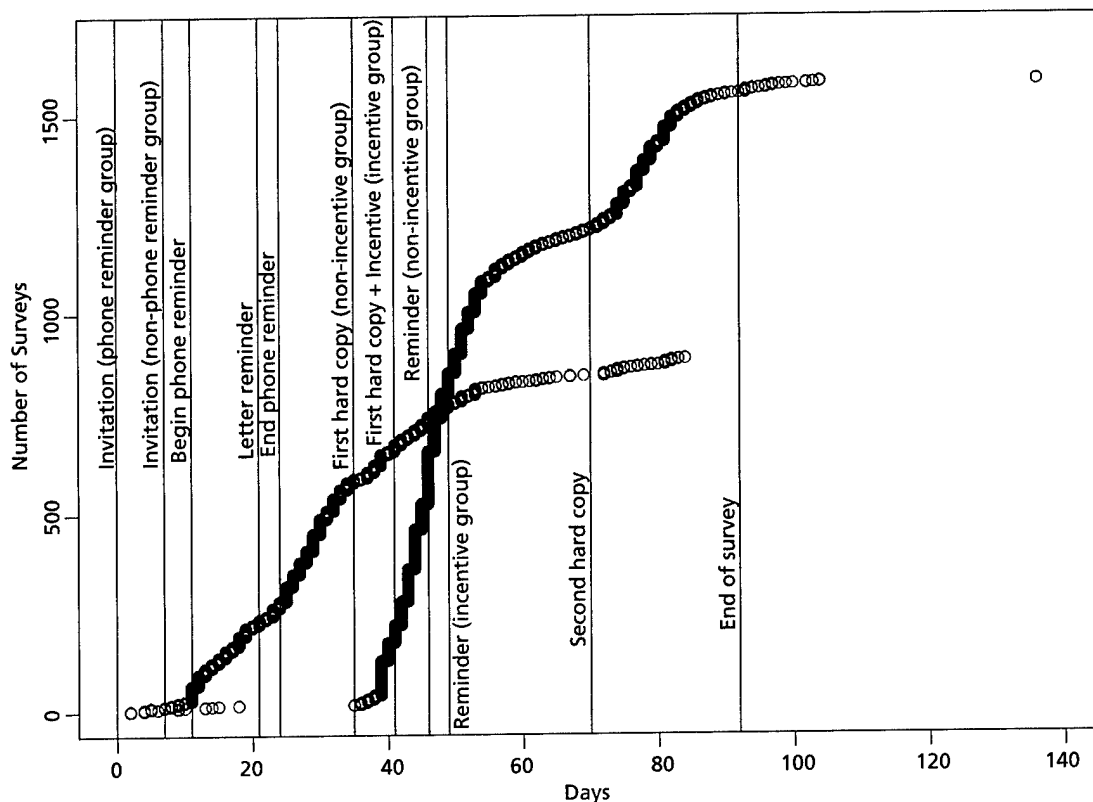
On the Internet, 86.5 percent of the people passed the three-question screener. For the mail respondents, 99.3 percent passed the screener questions. The Web respondents did not know ahead of time that their answers lead to ineligibility. Mail respondents whose answers lead to ineligibility were asked to return the survey. The difference in eligibility rates clearly reflects the survey mechanism rather than actual differences. The Internet screener-pass rate probably reflects eligibility more accurately than the mail eligibility rate because many of those mail recipients who were ineligible may not have returned the survey.

The Effect of Phone Reminders

Because the mail response option was not given right away¹ we first consider the effect of incentives and phone reminders under these circumstances. The phone reminder was conducted before hard copies of the

¹ Respondents had the mail option from the beginning, but it required requesting a hard copy of the questionnaire.

Figure F.1
Plot of the Number of Surveys Returned Over Time.



Note: By "time" the number of days since the survey start (2/22/01) is meant. For mail surveys this refers to the date a survey was filled out (self-report). Vertical bars indicate the times of various mailings, phone reminders, and incentives.

questionnaire were mailed out. The incentives were sent to nonresponders shortly after the questionnaires were mailed, as indicated in Table 3.1 and Figure F.1, but after the Web survey had been in the field for a number of weeks.

The phone reminders had a substantial effect on the response rate. The response rate² among people who received no phone reminder was 19.6 percent. The response rate among people who received a phone reminder was 24.4 percent (the difference is significant at $\alpha < 0.0001$). This represents an absolute increase of 4.8 percentage points or a relative increase of 24.5 percent. Among people who did not receive an incentive, people with a phone reminder did not respond any more often by mail than those who did receive a phone reminder.

The Effect of Incentives

It is less straightforward to compute the effect of incentives. Because incentives were only given to nonresponders, the response rate of those who received the \$3 incentive is actually lower than the rate of those who did not receive the incentive. Therefore, we estimate the incentive effect by comparing the response rate among

² Response rates refer to the definition RR4 (American Association for Public Opinion Research, 2000). RR4 includes incompletes and uses the number of estimated eligible nonrespondents rather than the total number of nonrespondents. We estimated that 86.5 percent of the nonrespondents with unknown eligibility are eligible. This corresponds to the fraction of Web respondents who passed the screening test.

people who did not respond before the first hard copies of the survey were sent out (i.e., after day 35, as shown in Table 3.1). The incentives were sent out with the hard copies on day 41 (see Figure F.1).

For the college students the response rate after day 35 among students receiving an incentive was 16.8 percent compared to 13.1 percent of those without an incentive, a 28.2 percent increase (significantly different at $\alpha < 0.0001$). The effect of incentives on high school students was larger. Among high school students, the response rate after day 35 with incentives was 31.5 percent and without incentives was 5.6 percent (significantly different at $\alpha < 0.0001$). The more than five-fold increase in response rates suggests that the use of incentives with high school students worked very well. While the high school group received different incentives (McDonalds) than the college group (Starbucks) the value of the incentive was the same (\$3).

The incentives in our survey protocol increased the number of responses received by mail, but did not increase the responses obtained via the Internet. Among those who received an incentive, 154 people responded over the Internet after day 35. This compares to 153 respondents of those who did not receive an incentive. Incentives were introduced at the same time as the hard copies of the surveys were mailed, whereas the Web survey had been in operation for 35 days already. Nonetheless, the fact that the Web survey responses were completely unaffected by the incentives is very surprising.

Regression Estimates

Table G.1 gives the definitions, means, and standard deviations of the variables used in the regression model, the results of which are summarized in Chapter Six. In addition, the table shows the coefficient estimates, standard error, and statistical significance. As discussed in Chapter Four, the model was estimated as an ordered logit and the coefficient estimates show the effect of each variable on the logit index function, denoted as S_{ij} in Chapter Four. To estimate the predicted effects shown in Chapter Six, we used the functional form for the logit cumulative distribution function, together with the ancillary parameters estimated as part of the model, to compute for each observation the probability of responding with each level of enlistment interest. The mean predicted probabilities are reported in Chapter Six.

Table G.1
Variable Definitions, Means, Standard Deviations, and Ordered Logit Regression Results

Variable	Definition	Mean	Standard Deviation	Coefficient Estimate	Standard Error
Collgrp	College student	0.5331	0.0042	-0.0625	0.0940
Dropgrp	Dropout	0.1418	0.0029	0.2994 ^b	0.1546
Male	Male	0.4552	0.0041	-1.0033 ^a	0.3789
Hispanic	Hispanic	0.0739	0.0021	0.3905 ^b	0.1788
Black	Black	0.1050	0.0032	0.1300	0.1655
Asian	Asian	0.0430	0.0019	-0.0849	0.1977
o_race	Other race	0.0698	0.0020	-0.0436	0.1885
Racemiss	Race missing	0.0462	0.0017	-0.6580 ^a	0.2614
Marrdum	Married	0.0200	0.0010	0.1042	0.2734
Marrmiss	Married missing	0.0312	0.0014	0.6072 ^b	0.3126
inc_76k	Income \$26K to \$75K	0.3612	0.0039	0.0438	0.1517
inc_over	Income over \$75K	0.2838	0.0036	-0.1563	0.1585
inc_don't	Income don't know	0.2682	0.0037	-0.3502 ^b	0.1620
Goodstud	Reported high school grades As or mostly As and Bs	0.6498	0.0039	-0.2100 ^a	0.0818
Gradmiss	High school grades missing	0.0300	0.00134	-0.0413	0.4418
hs_acad	High school program is academic	0.8801	0.0028	-0.3507 ^a	0.1399
Employed	Currently employed	0.6665	0.0039	0.2766 ^a	0.1012
Lookwork	Currently looking for work	0.1394	0.0029	0.3774 ^a	0.1256
Stipend	College stipend amount in dollars	895.4162	3.4244	0.0005 ^a	0.0000
Loanrep	Loan repayment program	0.1068	0.0025	0.6775 ^a	0.0610
colyr2	Stipend offered for two years	0.5357	0.0040	-0.1930 ^a	0.0245
col_major	Major requirement	0.4836	0.0040	-0.3435 ^a	0.0309
mil_occ	Military occupation requirement	0.5290	0.0040	-0.2473 ^a	0.0549
clmilocc	College group × military occupation requirement	0.2821	0.0031	-0.1633 ^a	0.0555
drmilocc	Dropout group × military occupation requirement	0.0756	0.0021	-0.2802 ^a	0.1056
entry_pay	Entry pay in dollars	26.4538	0.0154	0.0690 ^a	0.0085
entry_bonus	Entry bonus in dollars	8.8620	0.1006	0.0151 ^a	0.0015
pgm10_12	No college before accession for dropouts	0.0349	0.0015	0.2038	0.1471
p10_12occ	No college × military occupation requirement	0.0179	0.0011	-0.2683 ^a	0.1068
malstip	Male × stipend amount in dollars	407.7744	4.4362	0.0002 ^b	0.0001
malloan	Male × loan repayment program	0.0489	0.0019	0.0353	0.0965
malentbon	Male × entry bonus in dollars	4.0231	0.0820	0.0063 ^a	0.0023
malentpay	Male × entry pay in dollars	12.0421	0.1086	0.0281 ^a	0.0129
malcolyr2	Male × stipend offered for two years	0.2442	0.0037	-0.0203	0.0390
malmajor	Male × college major requirement	0.2206	0.0036	0.1434 ^a	0.0475
malmilocc	Male × military occupation requirement	0.2424	0.0037	0.2687 ^a	0.0523
malp10_12	Male × no college before accession for dropouts	0.0154	0.0010	0.3908	0.2600
_cut1	Ancillary parameter			0.6173	0.3321
_cut2	Ancillary parameter			1.3349	0.3344
_cut3	Ancillary parameter			1.7814	0.3342
_cut4	Ancillary parameter			2.4786	0.3348
_cut5	Ancillary parameter			3.5104	0.3349
_cut6	Ancillary parameter			4.9989	0.3382

Notes: ^a means statistically significant from zero at the 1 percent level.

^b means statistically significant from zero at the 5 percent level.

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The armed services prefer to recruit high-quality youth because of their better performance and lower attrition. However, high-quality youth are increasingly interested in attending college. Existing policies targeted toward the college market are likely to continue to be effective, but new policies must be developed to successfully penetrate this market further. This monograph reports on a research project that developed and implemented a national survey of college youth and analyzed the results. The survey offered respondents a series of hypothetical programs that would allow enlistees to attend college before accession into the military, and they were asked to rate their level of enlistment interest under each program. A \$65,000 college loan repayment program as part of a "college-before-accession" program had the largest effect on college market youth's probability of expressing a positive propensity to enlist, producing an increase in probability of over 50 percent. The survey also provides corroborating evidence on the importance of college dropouts as a source of high-quality recruits. Allowing college dropouts to enlist directly without first returning to college was associated with a stronger stated enlistment interest. In addition to programs such as loan repayment as part of a "college-before-accession" program, the authors conclude that if the services are to be successful in the college market, they must have in place an appropriate management infrastructure—such as incentive mechanisms for recruiters and an advertising campaign that supports recruiters' efforts.

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